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DIPHTHERIA AT ELLESMERE.

IT has been said that the public mind requires the shock of a great calamity to awaken it to a sense of the importance of sanitary matters. In the town of Ellesmere, within the last month, a whole family consisting of six children have died after a short illness from diphtheria; whether this calamity will have the much desired effect of creating deeper interest in sanitary improvements there remains to be seen.

The introduction and dissemination of the disease have been very clearly traced to a condition of sanitary arrangements which are discreditable to any authority empowered and professing to look after the health of the inhabitants of their district. The diphtheria seems to have been first introduced from a distance into the neighbouring village of Dudleston Heath; it there attacked several houses, and a considerable number of individuals, chiefly children. The school attended by these children is believed to have been the focus from which the cases spread, and the details given of the disgusting state of the school premises afford good reasons for agreeing with the justness of that conclusion.

In his report to the rural sanitary authority of Dudleston, Dr. Thursfield tells us 'that under the same roof as the schoolroom there existed a most injurious and horribly offensive collection of excrement, the effluvia from which was literally sickening.' In another part of the same district, a school having an average attendance of sixty scholars, had been so provided with latrines that there was only one common receptacle for the excreta from the several closets and that for the adjoining house. Other cases are given of even worse excrement nuisances being allowed to exist in the village; its water supply is reported to be both bad in quality and quantity; and the epidemic serves to confirm an experience common to both town and country, that neglected sanitary defects result in a soil being prepared for the introduction and rapid spread of such filth diseases as diphtheria and enteric fever.

From Dudleston the disease was introduced to Ellesmere by means of clothing belonging to the family at the Bridgewater Arms Hotel having been washed at one of the cottages at Dudleston. No case of diphtheria was traced to the cottage in question, but there were cases in houses on both sides of it, and with these there had been constant communication. Considering how readily the infection of diphtheria is carried, and the willingness of neighbours to assist each other in washing clothes and other household work during times of sickness, there is no difficulty in realising this mode of communicating the infection. The greatest interest is, however, in the excessive fatality attending the outbreak at the 'Bridgewater Arms.' We are not informed of the dates of the seizure and death of the several children, but the disease must have run its course very rapidly in each case, as the six children are reported to have died all within a few days of each other. What peculiar inherited tendencies contributed to the fatal result in their cases is a difficult point to answer satisfactorily; we occasionally meet with families where scarlet-fever is exceptionally fatal when it once begins, and there are others who readily suffer from enteric fever on only very slight exposure to infected matters; but in all these unusual cases, there are generally external circumstances which have long acted prejudicially on the health of the sufferers and has rendered them peculiarly liable to catch infection, and physically unable to withstand its additional depressing effects. Among these external circumstances, the constant breathing of air more or less polluted with sewage-gases is among the most potent, and drinking impure and sewage-contaminated water is no less hurtful, and particularly to young persons. The family at the 'Bridgewater Arms,' had been accustomed to both these dangers; the water-supply was obtained from a public pump which had been previously reported on as liable to sewage-contamination, and subsequent analysis proved that the suspicion was well-founded. Beneath the hotel runs a sewer common to several houses; between it and the house at least three direct connections were discovered, two by means of waste-pipes, and the other by a faulty closet soil pipe, which allowed a great escape of sewer-gas close to the bedrooms used by the children. These sanitary defects seem only to have been part of a generally neglected state of sanitary matters common to the town of Ellesmere. Dr. Thursfield, in his report to the urban sanitary authority for the last year, warns them in a very distinct manner, that the death-rate though low ought not to be taken as a test of the actual sanitary condition of the town, as, 'the sewers are of such faulty construction that the sewage stagnates in them; there is a want of sufficient or proper ventilation, and there are no adequate means of flushing them or private drains.' It is also urged, 'that there is great need for a public water-supply so as to replace the present polluted well-water, and to afford means for flushing the sewers, and to supply a sufficient quantity to allow of the general introduction of the water-closet system. It thus appears that both at Dudleston and Ellesmere, many offensive nuisances and defective sanitary arrangements existed, that the attention of the sanitary authorities had been called to these matters, and before the outbreak occurred the necessity for the immediate and complete alteration of these defects impressed upon them. It is unfortunate, but true, that a similar state of things now exists in many of our towns and villages, and there is only wanting the introduction of some infectious germ, to develop outbreaks which, if not so immediately disastrous, are equally to be deplored, on account of their destruction and maiming of many young and hopeful lives. But it can scarcely be, that there are many schools which are allowed to continue in such a shamefully neglected condition as the one from which the disease originally spread. The school managers are directly responsible for the state of the school, and they seem to have altogether failed in their duty towards the children attending the school, and in carrying out the requirements of the Education Department, to maintain the school premises in a healthy condition. It is satisfactorily proved that it was in consequence of these school premises being in a very unhealthy and neglected condition that many of the children were seized with diphtheria, causing the disease to spread to others, both in the village and at Ellesmere. The school having been closed on account of the epidemic, it is to be hoped the school inspector will be fully informed of the whole history of this outbreak,

and of the large share the school had in spreading the disease. If the Education Department were to censure these managers by withholding the annual grant from this particular school on account of their long-continued neglect of its sanitary arrangements, it would afford some evidence of the department's desire that school children should be trained in elementary sanitary knowledge, and that both by example and precept they should be taught a love for cleanliness, and to shun every contact with, or the appearance of filth.

ON THE CONSTRUCTION OF COTTAGES FOR THE LABOURING CLASSES IN RURAL DISTRICTS, SO AS TO COMPLY WITH SANITARY REQUIREMENTS.

BY HORACE SWETE, M.A., F.G.S., S.Sc. Cantab., Medical Officer of Health, Droitwich Combined Districts.*

THAT the present condition of the cottages of the labouring poor in the country is for the most part deplorable, is a fact which comes under the personal knowledge of every medical officer of health for a rural district. In our official rounds we see the poor literally 'hovelled and hustled together, each sex, like swine.' The exhaustive Parliamentary reports on the condition of the poor employed in agriculture, and the evidence of Her Majesty's Commissioners, published in 1866-70, show that this state of things is not only occasionally to be found, but is common to all England.

The cottages of the poor are shown to be for the most part deficient in room, more or less dilapidated, with little or no drainage, and with an insufficient or polluted water-supply. The evidence of a Kentish landowner is a characteristic description of what is constantly to be met with: 'Cottages are bad generally, their accommodation is generally miserable, especially as to the bedrooms; it frequently happens that boys and girls sleep in the same room, lads and lasses also; father, mother, and big children in very many cases occupying the same room. They may not be worse in Kent than in other counties, but they are emphatically bad. No decency can be observed in this kind of bedroom arrangement, and it is difficult to see how chastity and virtue can be inculcated under such circumstances. The sitting-rooms are deficient in comfort, too often stone or brick floored, draughty, cold, and wretched places, from which the father and grown up sons are only too glad to escape to the warm public-house near. The sanitary arrangements are horrible, and in short, the cottages of the working man are so contrived as to sap the foundations of morality, religion, and health.'

I will just glance at a few cases in my own district, in Worcestershire, consisting of twenty-four parishes.

I have reported one house where the children occupied a cupboard with an entrance door four feet in height; a window of one small pane of glass, so fixed that it could not be opened, and only about 40 cubic feet capacity for each inmate. Another case in which husband and wife and eight children of both sexes, ranging from twenty years of age to six months, occupied one bedroom and a small lean-to—the man and wife and the two youngest children having 181 cubic feet, the six children or rather young people only 70 per head. Another case in which a man, wife and six children, the eldest thirteen years old, occupied one sleeping room, with 111 cubic feet per head, the wife being near her confinement. Another, where three adults and seven children had only 120 cubic feet space per head in their single and dilapidated bedroom. Another, where the only bedroom, occupied by man, wife, and two girls, of fifteen and twelve years of age, was in the roof space with no side walls. Access—a loft door, 4 feet by 2 feet, in the outer wall, approached by a rough ladder made of poles with cross pieces nailed on. Here was no drain nor any privy accommodation, and an open well, level with with the garden, covered with an old sack. A still worse state of things existed at Hartlebury, where a whole family lived in a cave—veritable Troglodites of the nineteenth century—the family consisted of father and mother with four boys, ranging from from fifteen to nine years of age, the living cave gave 154 cubic feet per head, the bed cave 166 cubic feet—this was absolutely dark with no window nor any means of ventilation except by the door to the living cave. Over the roof of this cave was the garden, and these poor people paid 5*l.* a year rent. Dilapidation is much more frequently met with in the district than overcrowding, and, in fact, in some parts, as in Warndon, is the normal condition of things. At Cutnall Green, Elmley Lovett, and at Hindlip, are some very dilapidated cottages, some unfit for human habitation and others dangerous, with crumbling roofs and rotting walls. During the late wet weather the holes in the roofs of some of these tenements were painfully felt. One poor woman living in a cottage at Elmbridge, which I believe was church property, and for which she paid 4*l.* a year rent, said that during the night her husband and herself, both very old people, had to push the bedstead from side to side of the room as the wind shifted, and the rain poured through the rotten roof. I find the following entries in my note book: 'Visited Samuel Brooks' cottage, the Holloway, Elmbridge; pays 4*l.* per annum rent; cottage a miserable hovel; wife old with chronic bronchitis; the water comes up through the lower floor with a bad smell; the bedroom floor is rotten with large holes in it; several holes through the wall; the rain comes in all through the roof; the stairs are literally in pieces, and it is dangerous to walk up them; the privy and cesspit are against the rotten wall of the house; the well unsafe, the cover being in pieces; have paid rent fifteen years, and nothing has ever been done to the house; says it is trust property; whole house in a dilapidated state unfit for human habitation. At Upton Warren.—Ann Newbury.—Ill with bronchitis; water through roof; plaster of walls dilapidated; for thirty years paid 4*l.* rent; no repairs ever done. At Elmbridge.—Chapel House.—Child ill; house dilapidated; privy unfit for use; holes in roof; church property. Cutnall Green, Elmley Lovett.—Pardoe.—Bedroom roof leaky; man and wife, with four children, in one bedroom, and a dark cupboard; pay 4*l.* 10*s.* rent. Post Office and Blacksmith's Shop.—J. Highly.—Two adults and six children; pay 7*l.* rent; bedroom over wet cellar; walls damp; rain through roof; bricks out in back bedroom; wall stuffed with rags;

* Read at the Midland Society of Medical Officers of Health, October, 1876.

are often ill with rheumatism and bronchitis. Thos. Twigg.—Ill with rheumatism; 4*l.* rent; rains into bedroom, through floor to living-room. Crossway Green, Hartlebury.—Thos. Taylor.—Bedroom walls and roof dilapidated. Papwell Farm.—Daughter died of diphtheria; all the watershed of roof passes in an open drain through the cellar; one foot of water in cellar; house situated in a complete swamp. Norchard.—H. Hodinett.—Dilapidated house. John Wilks.—Rains into bedroom, plaster falling off. Oddingly Road.—Henry Willis.—Inner room dilapidated; overcrowded. Tibberton.—J. Chambers.—Bedroom dilapidated, rain coming in; privy unfit for use; filthy pig-styes abutting against house. Hindlip.—Mrs. Jones.—House in ruinous condition, holes in roof; well-cover rotten; privy disgraceful, no door, open to weather, walls made of old sacking; house shored up with timber; unfit for habitation. [Since closed.] T. Brown.—Cottage ruinous; stairs dilapidated; walls open to weather in bedrooms; dilapidated privy. Warndon.—Rectory house let out in four tenements; non-resident rector.—Roof dilapidated; holes in bedroom walls. Trotshill, Warndon.—Most of the cottages dilapidated, some dangerously so. Hanbury, cottages near 'Vernon Arms.'—Walls dilapidated; roofing bad. Stock.—Several cottages more or less dilapidated. Hartlebury, Upper Mitton, lane to canal.—Cottages in a filthy condition. Hartlebury Village.—Several houses much dilapidated. Canal side.—James Hutton.—Dilapidated; rain coming in bedroom.'

I might easily multiply these instances. At Hampton Lovett, Dodderhill, Hadsor, Oddingley, and Hanbury, resident landlords have done much to improve matters; several new cottages have been built, and old ones pulled down. At Salwarpe, the cottages are also in excellent condition, belonging to a resident landlord. The worst houses are those of squatters, trust property, and absentee landlords. Such a state of things as I have described cannot be otherwise than prejudicial to health, as it is contrary to the laws of decency and morality. Many of these cottages are picturesque, and present a pleasing outward appearance, but they are literally 'whited sepulchres.' Such is the condition of the buildings. Now with regard to drainage, which is, throughout the district, even in the case of some of the better houses, in a worse condition than that of the houses themselves. In many places there is simply no drainage whatever. Some cottages have no privy, others one between two or three houses. The slop drains are invariably bad, and in dangerous proximity to the well. The privies are mostly over holes in the earth, with no provision for removal; or, the old ash midden cesspit, with the well sunk between two cesspits. The slop drains, in most cases perilously near the well. Some cottages have no drainage of any kind.

Where there is an attempt at drainage it is generally choked by neglect, and the pipes at the back kitchen or wash-house sink, convey sewer-gases back to the house. At Hanbury, a case of typhoid was probably due to that cause. Many of the cottages, besides being ruinous, are damp from the want of surface drains to carry off the rain water, a fertile cause not only of rheumatism but of pulmonary phthisis. Many streets, or rather mud lanes, leading to new houses run up by speculators, are utterly without surface drainage; many blocks of houses have the ground floor under water. In one house, I found the cellar full and the sitting room floor rotted, the room being uninhabitable. The privy accommodation is for the most part disgracefully deficient, any sort of hovel being used for the purpose. Several privies are close to the back doors of houses, and I have found cottages without any sort of convenience whatever.

The water-supply is also in a very unsatisfactory state. In very few cases have I been able to say that the drinking water of my district is a good potable water. I have tested a large number of wells and have made a complete analysis of thirty-five, the only two of these which I have been able to pronounce good were at Rainbow Hill, on new premises where the contents of the cesspits had not had sufficient time to pollute the well. The wells of country cottages are invariably contaminated. Some I have found putrid and utterly unfit for drinking.

The following analyses of thirty-five wells, taken promiscuously throughout the district, will give a fair idea of the ordinary condition of villagers' water-supply. Is it to be wondered that they seek beer or cyder in preference to the filthy puddles called wells?

Quantitative Analysis.

No.	Samples taken by the Inspector from the following wells	Grains per gallon			Parts per million	
		Total solids	Chlorine	Hardness	Free Ammonia	Albuminoid Ammonia
1	Forest Hill, Hanbury	40	4·5	6	·05	·27
2	Ditto ditto	97	10·5	8	·00	·48
3	Woolmer's Green, ditto	30	6·	10	·04	·50
4	Dodderhill	89	7·	12·5	·00	·15
5	Wychbold, Dodderhill	146	9·	16	·16	·20
6	Crowle School	140	7·	28	·37	·25
7	Crowle Village	52	4·5	7	·02	·10
8	Earls Common, Himbelton	261	3·5	56	·04	·21
9	Shell	36	1·5	20	·08	·59
10	Tibberton School	65	3·	10	·64	·29
11	Hadsor School	55	8·	8	·04	·12
12	Wood Green, Warndon	57	5·5	7·5	·01	·19
13	Cold Harbour, Hindlip	83	14·	6	·05	·12
14	Cutnall Green, Elmley Lovett	131	9·	35	·08	·54
15	Huddington	21	6·	9	·80	·90
16	Ditto	84	14·3	20	·54	·84
17	Hartlebury	30	6·	10	·64	·46
18	Ditto	39	10·5	11	·03	·30
19	Ditto	37	6·	24	·00	·12
20	Ditto	64	7·	20	·06	·36
21	Claines, Barbourne	83	10·5	19	·00	·08
22	Ditto ditto	164	13·	11·5	·00	·22
23	Ditto ditto	136	6·	38·5	·06	·12
24	Ditto ditto	132	18·5	12·	·05	·84
25	Ditto ditto	69	4·	12	·01	·12
26	Ditto Northwick	251	13·	36	·74	·46
27	Ditto ditto	129	6·	35	·01	·23
28	Ditto ditto	64	8·	12	·00	·16
29	Ditto ditto	65	11·	11	·80	·22
30	Ditto ditto	37	11·	10	·02	·32
31	Ditto ditto	39	8·	9	·00	·08
32	Ditto Rainbow Hill	74	7·	8	·05	·20
33	Ditto ditto	88	5·	9	·02	·07
34	Ditto ditto	52	5·	8	·00	·21
35	Ditto ditto	62	3·	10	·10	·12

These samples being taken from wells in a salt district, the chlorine is constantly high and the total solids large. The table showing the qualitative analysis is given on the following page.

In order to remedy this deplorable state of things let me consider the principles on which proper cottages should be constructed.

The Land on which the Cottage stands.—This should not be less than a quarter or more than half an acre; it should be as far as possible elevated, not an old road way, or sunken clay pit, it should

Qualitative Analysis.

	SAMPLE	NITRATES	NITRITES	PHOSPHATES	SULPHATES	REMARKS
1	Forest Hill, Hanbury	Considerable quantity	Tolerable quantity	Trace	Considerable quantity	Very bad water. Putrid
2	Ditto ditto	None	Trace	Slight	Considerable	Bad water
3	Woolmer's Green, ditto	None	None	Considerable	Considerable	Bad water
4	Dodderhill	Slight	Slight	None	Tolerable quantity	Tolerably good
5	Wychbold, Dodderhill	Slight	Trace	Considerable	Tolerable	Bad water
6	Crowle School	Slight	None	Trace	Considerable	Very bad water
7	Crowle Village	Very slight	Very considerable	Slight	Tolerable	Tolerably good
8	Earl's Common, Himbelton	Trace	None	None	Very large	A mineral water
9	Shell	None	None	None	Slight	Bad water
10	Tibberton School	Moderate	Very large quantity	Tolerable	Tolerable	Very bad water
11	Hadsor School	Moderate	Considerable	Considerable	Moderate	Tolerably good
12	Wood Green, Warndon	Slight	Very slight	Tolerable	Considerable	Tolerably good
13	Cold Harbour, Hindlip	Very slight	Moderate	None	Considerable	Tolerably good
14	Cutnall Green, Elmley Lovett	Tolerable	Tolerable	Tolerable	Considerable	Bad water
15	Huddington	Trace	Trace	Moderate	Moderate	Unfit to drink. Putrid
16	Ditto	Moderate	Very considerable	Moderate	Considerable	Very bad water
17	Hartlebury	Moderate	Very large	Tolerable	Considerable	Very bad water. Putrid
18	Ditto	Trace	None	Considerable	Considerable	Bad water
19	Ditto	None	None	Moderate	Moderate	Tolerably good
20	Ditto	Slight	None	Trace	Moderate	Bad water
21	Claines, Barbourne	Sparingly	None	None	Sparingly	Bad water
22	Ditto ditto	Slight	Slight	None	Considerable	Tolerably good
23	Ditto ditto	Very slight	Trace	None	Considerable	Ditto ditto
24	Ditto ditto	Sparingly	Very considerable	Considerable	Considerable	Bad water
25	Ditto ditto	None	None	Slight	Moderate	Fairly good
26	Ditto Northwick	Slight	Very large quantity	None	Tolerable quantity	Unfit to drink
27	Ditto ditto	Considerable	None	Considerable	Considerable	Bad water
28	Ditto ditto	Slight	Considerable	Trace	Moderate	Tolerably good
29	Ditto ditto	None	Considerable	None	Moderate	Very bad
30	Ditto ditto	Trace	Slight	Moderate	Considerable	Bad water
31	Ditto ditto	None	Trace	Trace	Moderate	Good water
32	Ditto Rainbow Hill	Moderate	Trace	Trace	Moderate	Bad water
33	Ditto ditto	Trace	Moderate	Trace	Moderate	Good water
34	Ditto ditto	None	Trace	Trace	Moderate	Tolerably good
35	Ditto ditto	Trace	None	Moderate	Considerable	Bad water

not be too large to take the cottager from his paid labour, but sufficiently large to supply him and his family with vegetable food and to utilise the slops and sewage of the cottage. A Berkshire landlord so allots the garden ground to his cottages that the produce, with ordinary industry in after time work, will cover the cost of the rent, so that the industrious cottager virtually lives rent free.

The Surface Drainage. — All cottages should have sufficient pipe drainage to carry surface-water clear away from the house and its foundation.

The Foundation.—At least a foot of the surface ground should be taken out and filled in with rubble; in damp and clay soils this should be covered with concrete, and a damp course laid between the foundation and upper walling. The floor should in no case be less than one step in height above the ground. The *walls* should be of stone or brick, not less than fourteen inches in thickness to the flooring of the upper room, when one brick thick might be allowed. The *roof* should be of slate or tile, with as few valleys as possible, roof-valley being a source of leakage and considerable expense in keeping in repair. The *ground floor* should be of quarry tile, with cement skirtings, the upper floor of spruce or pitch pine.

Rooms.—No cottage should be built without one living room, one scullery, where cooking may be performed in the summer, three bedrooms, two of which should have fireplaces, and a pantry (not a cupboard) with a good window. The cubic capacity of the sitting-rooms should not be less than 1,000 cubic feet, and the bedrooms not less than 900 cubic feet. In my district the inspector cannot number up twenty cottages of the labouring class which have three bedrooms. *Windows* should all be made to open, both up and down stairs. The bedroom windows I would prefer to be iron-framed on swivels, the lower windows iron casements. I constantly find lower windows made a fixture. The door is considered by the landlord sufficient ventilation, so it is obliged to be left open in all weathers. No houses should be built back to back; there must always be a thorough ventilation by open windows.

The Sink.—If a sink is permitted at all, it should on no account be allowed to communicate directly with any drain, but have an open pipe over a grid, as in the plan I show you, which is made absolute in Rochdale. In country places I prefer an open slop place in the garden, properly bricked and trapped.

The Water-Supply.—The best tank for rain-water, a supply of which for washing is a great boon to the cottager, is the iron ship's tank, generally seen at coast-guard stations. Old tanks can be reasonably purchased, and, white-limed inside and tarred out, they will, when once fixed, last for years, and keep rain water much sweeter than in casks. These tanks should be fitted to the north or more shady side of the cottage. The *well* should be dug away from the house, and as far as possible from any source of pollution, as drains, privies, or pigsties. It is better for the cottager to fetch water a few yards than have it in a polluted state. The first ten or fifteen feet of wells should be jointed in cement and puddled to keep out surface water, which from the manuring of the garden will always contain organic matter.

Bake and Washhouse.—This should be a detached building; there is nothing more miserable than the close fœtid smell of washing, when done, as it often is, in the living room. The labourer coming home and finding the house full of steam, and the wet clothes flapping in his face, hung on lines across the room, as a matter of course goes off to 'the public.'

The Privy.—This also should be far from the cottage, and must, according to the present Act, be built for each cottage, have a proper door, and the ashpit be covered with a proper roof. When a proper cesspit can be constructed without danger to

the well, I prefer that plan, otherwise tubs under the seat will be found the best. In my district I have introduced these tubs to a considerable extent, and find them work well, as the cottager finds a difficulty in procuring a sufficiency of manure for his garden.

The Pigsty.—This should never be permitted nearer than twenty yards to the dwelling house; the yard should be properly drained with pipes to the cesspit.

I have thus given a rough sketch of what I consider the requirements of a cottage in the country. The more important point, however, is, how can such cottages be enforced, and how is the builder or landlord to obtain any return for his outlay. The greatest bane in the country, and specially in that part of it which is suburban, is that any builder may run up a cottage when and how he pleases, his only idea being to get as much rent as he can for as little outlay as possible. The only plan I can see of preventing this evil is that of obtaining for rural districts the urban power of making by-laws. At the recent Sanitary Conference in London, it was considered to be a great evil to separate urban and rural districts with distinct powers. In my district on one side of a road a cottage must be built under certain restrictions, and the plan submitted to the sanitary authority; whilst on the other side any builder may do what he pleases. In this part of my district, which is a suburb of the City of Worcester, we are now applying for urban powers, so as to put a check on speculative building. But how is the landlord to obtain a return for his outlay? First, I consider it the bounden duty of the lord of the soil to provide dwellings for those who cultivate it. The question of profit should not be entertained. I have carefully gone into the question of expenses in erecting neatly good cottages for the poor, and am able to lay plans before you even with the high prices caused by the wretched strikes and the influence of political stump agitators. I find that a landlord may obtain 3½ per cent., and yet have good and wholesome houses for his poorer tenants, which is as much as he can get from the consols. With regard to speculative builders, I have no compassion for them in any way. If a landlord wishes to enjoy the picturesque appearance of his cottages, that he ought to pay for, and not the cottager. The luxury of looking from his drawing-room windows on gabled roofs and twisted chimneys he should regard in the same manner as if he purchased a picture; it should not be charged on the tenants. Still, it is not right that a cottage should be positively ugly. The plans I have to show you are not so, and yet they are within the estimated expense. A good pair of cottages should not cost more than 350*l.*, but may be built for 300*l.*, and will bring in a rent of 2*s.* 6*d.* a week. A good single cottage would cost from 175*l.* to 200*l.*

To sum up in a few words, I want to see speculative builders checked by judicious by-laws; landlords compelled to provide proper cottages for their tenants; cottages to have three bedrooms and a proper pantry; wells to be dug where they cannot be polluted; privies and pigsties to be placed at a safe distance from houses; fireplace in all rooms and all windows to be capable of opening; rooms to be of sufficient cubic capacity, not less than 1,000 for a sitting-room, and 900 for a bedroom; no sink or slop-drains connected with any drain-pipe, and no damp foundations.

THE

SANITARY RECORD.

FRIDAY, JULY 6, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

REMOVAL OF INFECTIOUS PATIENTS.

AT the Newmarket Petty Sessions recently a London tradesman was fined 5*l.* and costs for knowingly removing a young woman who was suffering from symptoms of small-pox, without taking proper precautions against the spread of such disease, and also for wilfully exposing such person in a public railway carriage. Naturally the whole case turned on the word 'wilfully,' the defendant's plea being that he had no knowledge at the time of the removal that the disease was small-pox. It was admitted on both sides that at the time of the removal no eruption was visible, at least to an ordinary observer. The prosecution relied upon the general symptoms, which, it was held, plainly and without doubt were the symptoms of small-pox, and as such were quite sufficient to indicate the disease and necessitate proper and legal precautions.

On February 12 the girl was sick and had a dreadful headache, with pains in the back; she gradually got worse, until she was sent home on Thursday, the 15th. On this Thursday a medical man was called in. He looked at her and heard her describe her feelings. He turned up her left sleeve, looked closely at her arm and then at her face and neck, and asked if she had any spots about her. After the doctor had left, and after his making his report to the master of the house, the latter came upstairs 'in an excited state,' and told the girl she had better get home at once, and be ready at four o'clock, giving just two hours for preparation, etc. Wages and fare were paid, and a telegram being sent to the parents, the girl was met at Newmarket station and driven home to Chippenham. The next morning she was full of spots, and, according to medical evidence, on the 17th the spots were in the second stage.

Very wisely, on the advice and report of their medical officer of health, Dr. Armistead, the Newmarket Rural Sanitary Authority determined to prosecute, and it is to be hoped that the verdict they obtained will act as a caution to employers and to medical men who may be called in for advice in the early stages of infectious diseases, especially when occurring amongst *employés*. The evidence of the

medical man called by the defence in this case cannot be called satisfactory. According to the newspaper report, he saw her twice. He said to the master, 'If you wish to remove her, you had better do so before she gets worse. If she is going to have small-pox, you had better remove her to the hospital.' He also said that the evidence was not sufficient to necessitate her being sent to a small-pox hospital, and finally did not advise him where to send her, not being able to sware whether it was a case of small-pox or lumbago, and not knowing any difference between the pains which precede the one disease more than the other.

It is quite clear from the haste with which the girl was sent home which disease was most feared, and it is equally certain that the remarks of the chairman of the magistrates, 'that it was something monstrous that a person suffering from an infectious disease should be sent into a healthy village to endanger the lives of the inhabitants,' were not too strong.

The case has other points of national interest which should be well noted. It is not necessary that a disease should have fully developed itself to ensure conviction, and persons cannot any longer shelter themselves under the too common plea of ignorance; if they are in doubt, they must not expose the public to the dangers of their doubts. There is no denying the fact that to the negligence of the towns the country owes most of its infectious diseases, especially small-pox. As regards the medical man's conduct and advice, it ought to have been more decided. Medical men have a duty to perform to the public no less than to the persons who employ them. The tendency is rather to avoid inconvenience and loss to the establishment than to protect the patient or public. In this case the duty was clear and the neglect of it equally so. If sanitary authorities will only follow in the footsteps of Newmarket, 5*l.* penalty and some 20*l.* costs will soon convince careless or selfish heads of establishments that it is neither cheap, wise, nor humane, to rid themselves of responsibility by packing off home every case of suspicious disease which may happen amongst their servants or dependents.

The law as to infectious diseases requires immediate amendment, but the Newmarket justices deserve the thanks of the nation for their sensible decision in the above case.

Notes of the Week.

THE salary of the borough surveyor of King's Lynn has been augmented 15*l.* a year on account of his additional duties as inspector of nuisances.

AT the meeting of the Wandsworth Board of Works last week it was unanimously agreed to increase the salary of Mr. J. C. Radford, the surveyor, who has just completed one year's service, by 50*l.* per annum.

THE Local Board of Ilkeston has made an agreement with the directors of the gas-works in that town for the transfer of their undertaking to the board, as the urban sanitary authority, for the sum of 25,000*l.*

THE Birmingham Town Council have agreed with the Bank of England for a further loan of 500,000*l.* at 3½ per cent. for the purchase of premises required under the Artisans' Dwellings Act.

THE Prince of Wales has, through his Parliamentary agent, lodged in the Private Bill Office of the House of Commons a petition praying to be heard by counsel against the Norfolk Estuary Bill before the Committee appointed to consider that measure.

THE Harveian Oration was delivered on the 27th ult. at the College of Physicians by Dr. Sieveking, who vindicated Harvey against the claims urged in Italy on behalf of Andrea Cæsalpino, as the discoverer of the circulation of the blood.

THE return of the managers of the Metropolitan Asylums District shows that on Thursday, June 28, 685 cases of small-pox were under treatment—namely, 174 at Homerton, 110 at Stockwell, 182 at Hampstead, 79 at Fulham, and 140 at the Deptford Small-pox Hospital.

THE Council of the Institution of Civil Engineers have awarded the Manby Premium to Charles Norman Bazalgette, barrister-at-law, for his paper on 'The Sewage Question,' and a Telford Premium to William Anderson, for his 'Experiments and Observations on the Emission of Heat by Hot Water Pipes.'

THE drainage of the parish of Tollesbury, Essex, has been augmented by the addition of new sewers and outfall tanks, the works having been successfully carried out by Mr. R. Banyard, contractor, from the plans, and under the superintendence of Mr. Longdin, surveyor to the Maldon Union rural sanitary authority.

THE Merthyr Tydvil Local Board of Health has entered into an agreement with that for Aberdare to take the sewage of the latter district by a communication between the sewers in the parish of Llanxabon, and to dispose of the same, the terms and conditions to be settled hereafter by the umpire, Mr. Arnold Taylor, C.E., Local Government Board inspector.

DURING the past week a very large number of persons have lost their lives while bathing in the Thames and in the canals about London. Dr. Diplock investigated one case on Saturday, and has five more to investigate. Mr. Humphreys held an inquest on a boy of twelve, drowned at Poplar; Mr. Carter received information of two fatal bathing accidents, and Mr. Carttar of one.

THE plans prepared by Mr. Longdin, surveyor to the Maldon Union Rural Sanitary Authority, for the town portion of the parish of Burnham, Essex, have been accepted by the authority, and approved of by the Local Government Board, and will shortly be carried out. It is proposed to deal with the sewage by filtration tanks. The probable cost will be about 2,000*l.*

SINCE the beginning of July, 1876, to June 22, 1877, the number of bathers at the London Road Baths, Glasgow, has been 46,352, the amount of cash paid by them being 285*l.* 19*s.* 2*d.* The last month, however, had exceeded any other period, for during the twenty clear days from the 1st to the 22nd of June, the number of bathers had been 8,128—being 5,668 at 1*d.*, 1,744 at 2*d.*, 268 at 3*d.*, and 1,048 at 4*d.*, so that the money paid during that period was 56*l.* 9*s.*

GAS-ANALYSIS.

A HANDY little text-book on gas-analysis has recently been published by Winkler, entitled *Anleitung zur chemischen Untersuchung der Industriegase* (Freiberg: Engelhardt). He divides the gases into seven groups, according to their behaviour with reagents employed to absorb and remove certain of them. The scheme for the recognition of a gas by the changes which it exhibits during or after ignition is particularly valuable. Paper soaked in manganese chloride and rendered alkaline with soda is employed as a test for the presence of small quantities of oxygen.

SANITARY WORK IN GERMANY.

THE system adopted at Stuttgard of sending off the more solid constituents of the town sewage to agricultural districts, by rail in specially constructed trucks, is said to be a great success. It is so conducted as to be entirely unoffensive; the railway company benefit by the freight, agriculturalists gladly take over a valuable manure, and the town authorities get rid of their sewage at less expense than would be incurred in any of the ordinary methods generally employed. At a recent meeting of the Munich Society of Architects and Engineers, a resolution was carried by a majority of fifty votes against thirteen, to the effect that the proposed adoption of the water-carriage system for the disposal of the sewage of the city is in all respects unadvisable.

OPEN SPACES IN THE METROPOLIS.

SIR JAMES HOGG, chairman of the Metropolitan Board of Works, last week opened the St. Pancras Gardens, St. Pancras Road. These gardens were formerly the burial grounds of St. Pancras and St. Giles, and here repose the remains of Flaxman, Walker the lexicographer, Sir John Soane, the architect of the Bank of England, William Godwin, the author of 'Caleb Williams,' and his gifted daughter, Mrs. Shelley. The Baroness Burdett-Coutts laid the memorial foundation-stone, after which a special service was performed in the church, and a prayer offered that the grounds might contribute to the health, happiness, and recreation of the district. After the conclusion of the service, Sir J. Hogg planted a memorial tree close to the church entrance.

TREES IN TOWNS.

SOME valuable remarks on the planting of trees in towns were made by Mr. R. H. Alcock, F.L.S., at the meeting of the Manchester Field Naturalists' and Archæologists' Society at Handforth. Mr. Alcock, who has paid particular attention to tree-planting in towns for many years, gave the result of experiments he has made in planting trees in close proximity to his mill in the outskirts of the town of Bury, and said that the tendency to attribute every failure in plant cultivation in towns to smoke involves a fallacy which requires to be guarded against. He finds that rhododendrons, for instance, grow very well in his neighbourhood, regardless of smoke or soil, although they will not grow at all in the purer air of Evesham, in Worcestershire. Again, the plane tree, which flourishes in Paris and London, will not grow at Bury. Poplars make rapid growth at that place, but soon die. Limes, notwithstanding the smoky atmosphere, grow well in Bury and in Manchester. Among other trees which appear to flourish in smoke are the wych elm, sycamore, birch, horse-chestnut, and Turkey oak. Mr. Alcock has grown three or four plants of the ash for about four years, and they seem to do well. The beech also grows well, and he has not lost a single tree during the last twenty-five years. Many shrubby plants will also grow well. The holly or the hawthorn will grow anywhere. His experience of the laurel is adverse. The laburnum, on the other hand, does not mind the smoke. On the whole the effect of a smoky atmosphere on some trees seems to be favourable rather than otherwise.

HEALTH FOR THE MILLION.

The Examiner on Health of the Society of Arts Examinations says: 'I regret that there should be so small a proportion of the candidates whom I am able to recommend for a certificate. By far the greater number of the candidates are perfectly ignorant of anything that would be of the least practical use in domestic life.' The attention of the School Board might, with advantage, be turned in this direction. It is probable that practical instruction in Hygiene might prove to be more useful than lectures on Physiology.

MEDALS OF THE SOCIETY OF ARTS.

THE Albert Gold Medal of the Society of Arts, 'for distinguished merit in promoting Arts, Manufactures, or Commerce,' has been awarded to Jean Baptiste Dumas, the distinguished chemist, whose researches have exercised a very material influence on the advancement of the Industrial Arts. The Society's Gold Medal, for an improved system of lighting railway carriages, to Mr. Pintsch. The Society's medal for papers read during the session, to Professor Barff, M.A., for his paper on 'The Treatment of Iron for the Prevention of Corrosion,' and to B. St. John Ackers, for his paper entitled 'Deaf not Dumb.'

THE DEATH-RATE OF ST. GILES.

IN reference to Lord Beaconsfield's address on the occasion of opening the new buildings for working people at Battersea, in which his lordship said that the death-rate of St. Giles reached the alarming proportion of from 40 to 60 per 1,000, Mr. J. F. Staines, the medical officer for the parishes of St. Giles and Bloomsbury, while heartily corroborating the general tenour of Lord Beaconsfield's remarks as to the importance of supplying poor people with suitable dwellings, is of opinion that it would difficult to substantiate these figures, even in the most limited area. On reference to statistics, he finds that the death-rate of the St. Giles's district in 1875 was 25·99 per 1·000, while the average rate for the past three years was 26·24.

LONDON WATER-SUPPLY.

MAJOR BOLTON, in his monthly report on the London water-supply, says 'the deterioration of the waters of the Thames and Lea generally by sewage pollution continues, and points to the necessity of measures being adopted to prevent the contamination of these rivers and their tributaries (so long as they are the authorised sources of supply of the metropolitan water companies) by the people living on the upper reaches, who now treat the tributary streams, as well as the rivers, as common sewers, both at their sources and during their course. It must also be borne in mind that the population of the country through which the Thames and Lea flow is reported to be rapidly increasing in density.'

PUBLIC HEALTH (METROPOLIS) BILL.

THE Parliamentary Committee of the Metropolitan Board of Works at the last meeting brought up a report with reference to the Public Health (Metropolis) Bill, which professes to be one for the consolidation of the several Acts relating to nuisance removal and sanitary matters, but which contains clauses nominating the Local Government Board as a controlling power over vestries and district boards in the exercise of their functions as sanitary authorities in place of the Home Secretary, who at present possesses the power of control. The vestries and district boards will be subject, in certain events, to be superseded by another authority, to be appointed by the Local Government Board. This the committee considered a serious step towards centralisation in local government, and had accordingly directed a letter to be addressed to the vestries and district boards on the subject, suggesting that immediate steps be taken in the matter. The action of the committee was approved by the board, and the chairman was requested to watch the progress of the bill, and take the necessary measures with reference to it.

VICTORIA DWELLINGS ASSOCIATION.

THE Victoria Dwellings Association, whose first buildings were opened in Battersea Park on the 23rd ult. by the Prime Minister has published a prospectus showing the objects and scope of the company. Its nominal capital is three millions, of this a first issue of 500,000*l.* in 50,000 shares of 10*l.* each is to be now made. The intention is to supply healthy and comfortable homes for artisans, and more especially for labourers. A commencement has now been made in the erection of houses for 2,500 persons at Stroud Vale, near King's Cross. Not less than 5 per cent. is expected to be paid, and on the executive council, presided over by Mr. Walter, M.P., are many practical men, comprising bankers, builders, engineers, physicians, etc. The sanitary benefit to the public at large arising from any improvement in the unfortunately too-crowded condition of the haunts of the poorer classes at present is a sufficiently strong reason for the success of such a scheme as that now brought forward.

LONDON RATES.

LORD DELAWARR has obtained a return of the sums expended in the metropolitan district, exclusive of the City of London, on paving, lighting, drainage, water-supply, sanitary arrangements, and other works not under the jurisdiction of the Metropolitan Board during the three years ending 1876. The information has been supplied by the London vestries and district boards. The average population of this area may upon estimate be taken as 3,400,000. The area in statute acres, after allowing for the space occupied by the City, is, 74,694. The three years' outlay, taking sums roundly, amounted in all to 4,098,000*l.* The yearly average was therefore 1,366,000*l.* The paving cost 1,742,000*l.*, the lighting 707,000*l.*, drainage 352,000*l.*, water-supply 208,000*l.*, and 'sanitary arrangements'—so termed here, though clearing paving, drainage, and water-supply are sanitary arrangements of primary need—437,000*l.*, and a large and unexplained item under the head 'other works' 651,000*l.* This item of 'other works' is exceptionally heavy in some districts. Thus in Lambeth, out of a total expenditure of 280,420*l.*, no less than 134,906*l.* is ascribed to 'other works;' in Paddington, out of a total of 159,467*l.*, 58,216*l.* is placed under this same head. Nearly a third of the disbursements of Camberwell comes in this miscellaneous column. At Limehouse the total expenditure for the three years was 152,417*l.*, of which 93,307*l.* is for 'other works.' There are six districts and vestries whose individual expenditure for the three years exceeded 200,000*l.* These are—St. Marylebone, 240,120*l.*; St. Pancras, 256,573*l.*; Lambeth, 280,420*l.*; Islington, 221,344*l.*; Camberwell, 236,084*l.*; and Wandsworth, 219,932*l.* The average of total expenditure per head of population in this extra civic metropolitan area was 24*s.* for the three years, or 8*s.* annually. The similar expenditure by the Metropolitan Board of Works for the year 1875–76 was 967,000*l.*—i.e. on sanitary works and improvements alone.

Special Reports.

THE DWELLINGS OF THE LABOURING CLASSES.

THE Society for Improving the Condition of the Labouring Classes held its thirty-third annual meeting last week, the Earl of Shaftesbury presiding. This society was the first to set about the work of improving the condition of the dwellings of the lower classes of labourers, a very distinct class from the artisans, and a class very much below those to whom the term 'working men' is generally applied. The report stated that the properties taken by the society in the low neighbourhoods of London, and cleansed, improved, and let out as habitable dwellings to the poor labouring classes were well let. The society has 54 dwellings in Streatham Street, Bloomsbury; rooms for 20 families and 128 single women in Portpool Lane, Gray's Inn Lane, with public washhouses adjacent; dwellings for 102 families in Wild Court, Drury Lane; dwellings for 87 families and lodgings for 36 single men in Tyndall's Buildings, Gray's Inn Road; dwellings for 78 families in Clark's Buildings, St. Giles's-in-the-Fields, and other places in George Street, Bloomsbury; in Charles Street, Drury Lane, and in Great St. Andrew Street, St. Giles's. At all these places the people, from living in decent and well-ordered dwellings, were much better behaved than in other places, and the percentage of deaths to the population of the dwellings was below the average death-rate of London, a proof that the health of the community was improved by bettering the dwellings of these poor people. The Hon. W. Cowper-Temple, M.P., moved the adoption of the report, and said that this society did not attempt to set up huge buildings for the better-off classes, but aimed only at taking over the existing courts and places where the poorest people dwelt, and after making the dwellings healthful, to let them out at a rent within the reach of the people whose condition the society aimed at improving. The motion was seconded and carried. The Marquis of Hertford, who said he had been a subscriber to this work for thirty years, proposed the re-election of the committee, and spoke of the lively interest taken by the late Prince Consort in such work. Mr. T. B. Smithies, the editor of the *British Workman*, seconded the motion, which was agreed to. Lord Shaftesbury afterwards said that many classes of work-people had been provided for out of town, but the labourers could not leave the scene of their labours, or they lost their jobs. And these people, whose labour was essentially necessary to a great city, were so wretchedly housed that he looked upon it as a miracle that they did not rise up against their wrong. Owing to the displacements in the name of 'improvements' in parts of the metropolis the people were more overcrowded than ever, and their circumstances were such as to make them likely to be ready listeners to agitators if those evils were not in good time removed.

VICTORIA DWELLINGS ASSOCIATION.

THE *Builder* gives the following particulars of the construction and sanitary arrangements of the dwellings lately erected by the company (SANITARY RECORD, June 29). 'In the artisans' block each dwelling is self-contained. Most of the tenements consist of three rooms, viz., living room, bedroom, and kitchen, and a few of them contain an extra bedroom. The buildings are four stories high, and each of the six sub-blocks contains about four tenements on each floor. The total number of tenements in the artisans' block (of which alone we are speaking) is 98, containing 304 rooms. The three-roomed tenements, we understand, will be let at 8*s.* per week, and the four-roomed tenements at 10*s.* per week, or more or less, according to size. The living rooms in this block are about 165 ft. super., and are provided with range, containing oven and boiler; also with a large and spacious cupboard, which will serve as cupboard and dresser or china-closet combined. The kitchens are each provided with Jenning's improved patent sink, which, besides answering all the requirements of an ordinary household sink, also forms (1) a trough for washing plates, dishes, and vegetables, (2) a convenient wash-tub for linen, etc., (3) a child's bath, (4) a lavatory; it is also available as a sink for butlers' pantries, etc. It is simple in construction, and appears hardly likely to get out of order. It consists of a trough of about the same dimensions as an ordinary sink, except that it is twice as deep. At one end a small space is partitioned off, a slit being left at the bottom the whole length of the partition. Through this slit run all slops emptied into the sink, and thence down the pipe which opens into the bottom of the small space parted off. The small space is provided

with a movable top resting on the partition, and in the centre of this movable top is an ingenious contrivance in the form of a plug, which can be let down into or raised from the pipe at will. When the plug is down, nothing from the bottom of the sink can run down the pipe. By turning on the water the sink can thus be used as a trough, but should the water from any cause be left running, the sink cannot overflow, except over the partition into the small space referred to, and thence down through the plug, which is made hollow, and of the same height as the partition. The whole thing is very useful and simple, though at the same time ingenious, and is well worth inspecting. It can of course be made in various materials, galvanised iron being used in the buildings under notice. There is a constant supply of water, so that the cisterns are always full, and over each sink is one of Jennings's patent self-closing balanced taps, so that the water cannot be inadvertently left running. The water closets (of which there is one to each tenement) are fitted with Jenning's patent valve closet and trap, in one piece of earthenware. All the water-closets are cut off from the dwelling-rooms, and are approached through the open air, though with a covered access. Each closet is provided with a separately-hinged extra seat or cover, which can be lifted up when it is desired to empty slops or to use the closet as a urinal. The bedrooms have an area of about 100 ft. super. Each dwelling has its own coal-bunker, and on each of the landings (common to about four dwellings) access can be had to a dust-shoot. The staircases are in each instance placed at the back of the blocks fronting to thoroughfares, in order to obtain front windows to as many rooms as possible. All passages and staircases are lighted by gas from lanterns so contrived in the thickness of the staircase wall as to light the stairs on both sides of the wall, while being, at the same time, out of the way during the carrying up or down of furniture, etc. Gas is not laid on to the rooms. All staircases and passages are wholly of fireproof material, consisting of a kind of artificial stone. The rooms are all rectangular, without projections or irregularities of shape, thus ensuring the advantage of the floor area of the rooms to the fullest extent. All drains are taken outside the buildings, but they are not directly connected with the sewer. They are intercepted, as we are told, by a specially contrived earthenware cess-trap, patented by Mr. George Jennings, which is open to the air and admits of being easily inspected and cleaned out from the surface. There is no direct connection between the waste-pipes from the sinks and drains, and all t he soil-pipes of water-closets are open to the air, being carried, it is stated, above the roofs of the buildings. The walls are of picked stocks, with artificial stone lintels, etc. The roofs are covered with thé Broomhall Tile Company's patent tiles, glass tiles to match having been inserted where needed.

Adjoining the 'artisans'' dwellings are two blocks for 'labourers,' with a total of 152 rooms, some tenements consisting of two rooms, and some of only one room. These blocks of 'labourers'' dwellings form two elongated parallelograms, divided by a street, or approach, 30 ft. wide, with gates opening out into the York Road. Each block is four stories high, and there are two staircases in each, placed nearly at each end of the blocks. Each floor contains about eight two-roomed tenements and four single-roomed tenements. The two-roomed tenements consist of living-room and bedroom, the living-room being provided with a bed recess, as also are each of the single-roomed tenements. Water-closets are provided to the number of four on each floor, or one to about every three families or tenants. These water-closets are approached from the common staircases and passages. Each of the floors above the ground-floors has a continuous balcony running the entire length of the frontage, and on to this balcony the staircases and passages leading to the various dwellings open. The construction is in all essential particulars the same as that of the 'artisans'' block, already described. The rents obtainable for these 'labourers'' dwellings (which are all let) vary from 6*s.* for a living-room and bedroom to 2*s.* 6*d.* for a single room. Dust-shoots, coal-bunkers, sinks, etc., are provided for all the tenements. Separate ranges of washhouses, for the sole use of tenants, and drying-grounds are provided for each block of dwellings. The coppers are provided with water-supply, Tylor and Sons' patent screw-down traps being used. There are about twenty washing-troughs and twenty coppers provided for each block.

HOME HOSPITALS FOR THE WELL-TO-DO.

A PUBLIC meeting was held at the Mansion House on the 27th ult., in support of a movement for the founding of a hospital 'replete with every possible comfort and provision for the privacy and proper treatment of well-to-do patients, to which admission should be by payment alone.' The Lord Mayor occupied the chair, and amongst those present were the Earl of Bessborough, Mr. Walter, M.P., Mr. J. Blake, M.P., Rev. Canon Miller, Monsignor Capel, and Sir F. Hicks. Letters of apology for non-attendance had been received from the Duke of Northumberland, Sir J. Paget, Sir W. Jenner, Dean Stanley, the Bishop of Winchester, and others. A resolution in favour of the establishment of an association with the object of providing hospital treatment, skilled nursing, and convalescent institutions, for the benefit of all classes who can afford to pay was moved by Mr. J. Walter, M.P., seconded by Dr. J. R. Bennett, and supported by Sir R. Alcock, K.C.B., and the Rev. Canon Miller. Dr. Glover remarked that for infectious diseases there was already ample provision in London. The resolution was carried, with three dissentients. Another resolution directed against the abuse of hospitals by persons who can afford to pay for their treatment, and in favour of well-regulated hospitals and convalescent institutions to which the medical profession could send 'with confidence patients willing to defray the cost of the accommodation which they require and cannot otherwise obtain,' was proposed by Monsignor Capel, seconded by Mr. J. Hutchinson, L.R.C.S., and agreed to. A provisional committee, with the Lord Mayor at its head, was appointed to carry out the objects embraced in the resolutions.

PUBLIC HEALTH (METROPOLIS) BILL.

AT the usual fortnightly meeting of the Strand District Board of Works, held on Wednesday, the 27th ult., with Dr. Cooper presiding, the health committee reported pointing out to the board that the Public Health Metropolis Bill sought to give the Local Government Board controlling powers over the local sanitary authorities, and in some cases to supersede them. The chairman said the St. Giles's Board had petitioned against the bill, and sought the assistance of the members of Parliament for the borough. Mr. Fowler complained of the most insidious attempt on the part of the Local Government Board in the matter, which was one that required immediate attention. They ought to obtain the postponement of legislation for another year until it could be satisfactorily determined of whom the sanitary authority should consist. He moved that a petition be presented against the bill, and that copies of the petition be sent to the borough and county members with the request that they would support the same. This course was resolved upon by the board, after some remarks had been made about the probable cost of putting the proposed machinery into force should the bill become law.

CHELSEA WATER WORKS COMPANY.

AT the half-yearly general meeting of the above company, held last week, under the presidency of Mr. John Deedes, the governor of the company, Mr. Gill the Secretary, read the report of the directors, which stated that the money received on account of capital, in the financial year to the 31st of March last, amounted to 64,330*l.*, and the expenditure in the same period to 74,775*l.* The gross rate water rental for the year amounted

to 93,178*l.* 6*s.* 8*d.*, and the charge for maintenance and management to 28,434*l.* 1*s.* 8*d.* After providing for all claims chargeable against the account for working expenses and dividends and interest accrued on the preference stocks there remained a sum of 48,685*l.* 5*s.* 10*d.*, applicable to the payment of dividend on the ordinary stock of the company. The chairman moved the adoption of the report and accounts. The resolution was carried unanimously, and a dividend was declared at the rate of 6 per cent. per annum on the ordinary stock. The retiring directors were reappointed, and the meeting was adjourned till Monday next to announce the result of the poll with respect to the election of auditors. The meeting closed with a vote of thanks to the chairman and the directors.

Parliamentary Proceedings.

HOUSE OF LORDS.

(*Friday, June 29.*)

METROPOLIS IMPROVEMENTS.

THE Provisional Orders Confirmation (Great Wild Street, etc.) Bill passed through Committee.

THE TRADE MARKS BILL.

THE Trade Marks Bill was read a second time.

LOCAL GOVERNMENT PROVISIONAL ORDERS (BRIDLINGTON, ETC.) BILLS.

IN reply to a question from Earl Granville,

The Duke of Richmond and Gordon stated that in consequence of the large increase in the population of Bridlington, it was considered necessary to place it under local government, and the usual local inquiries had been made and the views of the inhabitants ascertained.

The bill then passed through committee, and also the Public Works Loans Bill.

The Gas and Water Orders Confirmation (Abingdon, etc.) Bill was read a third time and passed.

HOUSE OF COMMONS.

(*Thursday, June 28.*)

VACCINATION.

MR. HOPWOOD asked the Attorney-General whether he was aware that another summons was, on the 19th inst., issued against Joseph Abel, of Farringdon, for the vaccination of his child, Frederick Abel, under 30 and 31 Vict. cap. 84, sect. 31, and whether it is discretionary with the justice, under the words 'he may if he see fit,' to refuse to make the order to vaccinate.

The Attorney-General: I am not in possession of any information with respect to the case of Joseph Abel's child, and therefore I am unable to inform my hon. and learned friend whether another summons has been issued. With regard to the legal point upon which I am interrogated, I beg to state that in my view a magistrate who acts under the 31st section of the Vaccination Act, 1867, acts judicially, and may make an order or not as he pleases. In this sense he has a discretion, but I consider that a magistrate who, after it has been clearly proved before him that a child has not been vaccinated, and that there is no reason why the operation should not be performed, should exercise his discretion by declining to make an order for vaccination would disregard his duty, just as much as another magistrate would disregard his who, after the commission of an offence had been clearly established by evidence, should exercise his discretion by declining to convict the offender. In conclusion, I beg to refer my hon. and learned friend to an authority bearing on this question, namely, *Morisse* v. *The Royal British Bank*, reported in the 26th volume of the *Law Journal*.

LIME JUICE.

THE Chancellor of the Exchequer, in replying to Mr. Anderson, said, after consultation with the Board of Trade and the authorities of the Custom House, the Treasury had decided to allow fortified lime juice to be exported in future as merchandise, and not merely as ships' stores.

ANTI-VACCINATION.

MR. SCLATER-BOOTH, in reply to Mr. Greene, stated that it was true that in Toxteth Park, Liverpool, one child out of an unvaccinated family of eight had died from the small-pox, and the other seven were very seriously ill from the same disease. The father stated that he had been several times fined in Glasgow—whence he had recently come—rather than have his children vaccinated.

Law Reports.

WATER AT FORFAR, N.B.

THE Court of Session of Scotland has been considering the water-supply of Forfar. Several months ago the Board of Supervision called upon the local authority to introduce a sufficient supply of wholesome water for the use of the inhabitants; but as disputes arose in the Town Council on the subject, the question was so long delayed that the Board of Supervision were compelled to lodge a petition asking their lordships to ordain the local authority to introduce a scheme for providing a sufficient supply of water; and certain proceedings followed upon the presentation of that petition. A joint minute was lodged for parties, by which they agree that the court should pronounce an interlocutor finding that the respondents have failed to do what was required of them by the Public Health (Scotland) Act, 1867, and that obstructions have thereby arisen in the execution of that Act, and that the respondents are bound to take proceedings required by statute for introducing a supply of water sufficient and suitable for the domestic use of the inhabitants of the burgh of Forfar, and for the sanitary and other public purposes of the burgh, ordaining them forthwith to take and carry out the proceedings necessary for carrying into effect the scheme now proposed by the respondents. The court accordingly pronounced an interlocutor in accordance with the joint minute. The respondents to pay expenses, and the case *quoad ultra* continued.

POLLUTION OF STREAMS.

MR. JUSTICE FRY has had before him the case of *Pennington* v. *The Brinsop Hall Coal Company*. This suit was commenced to restrain the defendant company from discharging water from their mines and colliery into a stream called the Borsden Brook, at Hindley, Lancashire, so as to cause injury and damage to the mill, engine boilers, and works of the plaintiff, or so as to cause the stream to flow to the mill in a state less pure than that in which it flowed there previously to the defendants' reopening their mines and colliery, and from discharging into the stream to the injury of the plaintiffs any deleterious water or any noxious fluids or other foul matter. Damages were also claimed for alleged past injury. His lordship, in delivering judgment, said the plaintiffs claim to be entitled to an injunction to restrain the injury complained of in fouling the stream, and say they are damaged thereby. They further claim that even if they are not damaged, they are entitled to an injunction, and he thought they were in either case. He concluded that the plaintiffs' evidence established that, notwithstanding the means adopted by the defendants, the use of subsidence reservoirs and filter-beds, which were mechanical means to cleanse the water discharged from pit No. 4, such discharge impregnated the stream with sufficient free sulphuric acid an sulphate of iron to cause the injury complained of, the

fact of which injury was established. Severa ingenious suggestions had been made by the defendants to repel the conclusion that the injury was caused by them. First, his Lordship dealt with evidence tending to show that the discharge was not acid, which seemed to show that it was at times alkaline and at times acid; next, he disposed of a differential experiment as not conducted with such care as to render it trustworthy; and, thirdly, he rejected the suggestion that the injury was caused by others. The defendants had also contended that if damage was caused the justice of the case would be satisfied by awarding damages and not granting an injunction. The only cases in which damages had been given were cases where a building had been erected interfering with access to light and air. Such cases differed materially from injury to water, in that the amount of damages was already fixed; and in injury of this kind the amount of damages might grow. Besides, a riparian proprietor was entitled to acquire future rights. The amount of loss on this account could not be ascertained. He would, therefore, grant an injunction, giving the defendants three months before it should be put in force, on their undertaking to abide by any order the Court should make as to future damages in the meanwhile.

THE ADULTERATION ACT.

THE Queen's Bench Division has had before it the case of *Webb* v. *Knight*, which raised the question whether gin and water can be considered as gin within the meaning of the Adulteration Act. The appellant had been convicted at Burslem for selling a pint of gin, which was not of the nature, substance, and quality of gin, the article demanded by the purchaser. It was proved that the respondent (who is assistant inspector) went to the hotel kept by the appellant, and asked for gin. The man who served him asked him at what price he wanted it, stating that he could have it at 2*s.* and at 1*s.* 4*d.* per pint. The inspector asked for that at 1*s.* 4*d.*, which was supplied. The analyst found that 43 per cent. of the gin was water, and that it was not so adulterated as to be injurious to health. It was contended on the part of the appellant that the gin, as sold, could not be to the prejudice of the purchaser, as he had selected a low-priced gin, and that he got his value in genuine spirit, diluted only by the addition of water, to accommodate the purchaser in the price to be paid, and that he got a more diluted spirit. On the part of the respondent, it was insisted that when a purchaser asked for gin it was to the prejudice of the purchaser if he got gin mixed with a large quantity of water, and the magistrate so held, and convicted the seller, who now appealed. On a former hearing the Court suggested that the statement of the case by the magistrate should be sent back for further information as to whether the liquor sold was of the 'nature, substance, and quality of gin usually sold at the price in the neighbourhood,' and the magistrate said he could only refer to other cases of a similar character to the present awaiting the decision of the High Court of this case; the following being the prices paid for the gin in each case, with the percentage of water:—Prices paid.—2*s.* per pint. 29·8 per cent. of water; 1*s.* 10*d.*, 31·5; 1*s.* 4*d.*, 32; 1*s.*, 51·10; 2*s.*, 44·10; 1*s.* 4*d.*, 40·30; and 1*s.* 8*d.*, 52·28. The magistrate added that he had convicted the defendant because he had not brought himself within the exception of the 25th sec. of the Act which exempts the seller if he has bought the article in the same state and without warranty. On this additional statement the case now came on again. The Court upheld the conviction. Mr. Justice Mellor said a reasonable view must be taken of such a matter, and if it appeared clearly that there was a general custom to sell a certain mixture as gin, as the purchaser would have the article commercially known as such, it would not be within the Act; but here it did not appear to be the case. The particular mixture must be a question of fact, and the facts being here similar to those in the case cited, and the reason given for the decision in that case being such as he concurred in, he could not decide this case differently from that. Mr. Justice Lush concurred. No doubt, he said, gin was a compound article which had in it a mixture of water. But was it of the 'quality' as well as nature of the article purchased? The purchaser could not for the lowest price expect a purer and stronger spirit. It was a question of degree and of the quantity of water added, and here the magistrate had in effect found that the quantity of water added was in excess of what could properly be added. The Court could not contradict that finding, nor differ from the decision cited. Conviction affirmed.

THE OBLIGATIONS OF WATER COMPANIES.

THE Court of Appeal has had before it the case of *Atkinson* v. *The Newcastle and Gateshead Water Company*. The plaintiff is the owner of the Elswick Saw Mills, within the defendants' district; the defendants are obliged to fix fire-plugs in the streets and supply them with water at a certain pressure, and to supply the Town Commissioners with water for certain purposes, and to supply all the houses in Newcastle and Gateshead with water at the same pressure, under a penalty of 10*l.*, and in the case of the Town Commissioners and the domestic supply to the inhabitants, an additional forfeiture to the party aggrieved of 40*s.* for each day's failure to perform their duty in that respect, unless prevented by frost, unusual drought, or unavoidable cause or accident, or during necessary repairs. They are also empowered to supply water by special contract for trade purposes, or purposes other than domestic. They had contracted to supply water to two hydrants on the plaintiff's premises, for the purposes of his business, but no express terms had been made as to pressure. The contract rate for all the water used by the plaintiff, including the supply to the hydrants, was 30*l.* per annum. A fire broke out on the plaintiff's premises on February 20, 1870. On the hydrants being put in requisition it was found that for some reason the pressure, which was usually sufficient to throw the water to the top story of the plaintiff's premises, was insufficient to throw it upon the fire at all, so that the hydrants were absolutely useless. Plugs near the premises were in the same state. In the afternoon the pressure improved, but not before the plaintiff's premises had been almost destroyed. At 3 o'clock the hydrants were at full pressure, and by them the fire was ultimately put out. In the action, two causes of action were alleged—first, the breach of statutory duty, of which the defendants were guilty in not keeping the fire-plugs supplied; and, secondly, a breach of contract in not keeping the plaintiff's hydrants supplied with water at the statutory pressure. The defendants demurred to the part of the declaration which claimed damages for the breach of statutory duty, on the ground that the defendants' liability was limited to 40*s.* penalty. This demurrer was overruled by the Court of Exchequer, on May 25, 1871. At the trial, before Baron Martin, evidence was given showing that the water-supply in Newcastle and Gateshead is effected by gravitation; that if the communications and valves had been in order, there must have been sufficient pressure; but no suggestion was made as to what was the cause of the absence of pressure. The jury found that there had been a deficiency in the statutory pressure at all the plugs and at the hydrants on the occasion in question, and that the deficiency was caused by an unavoidable accident, and also that there was no contract between the parties for the supply of water at the hydrants at the statutory pressure. The verdict was therefore entered for the defendants, but the plaintiff sued for a new trial; he was, however, refused. Cross appeals were thereupon brought—by the defendants against the judgment on the demurrer, and by the plaintiff against that on the rule for a new trial. The Lord Chancellor said—Apart from authority I should be of opinion that the scheme of this Act was not to create a duty which would be the subject of an action at the suit of any individual who was in any way injured by its breach. It

did not create a right to be enforced in the ordinary way by action; but it laid down a series of duties to be performed by the company, and gave a guarantee for their performance by the imposing of penalties. And it has provided that where it is convenient, the penalty shall go into the pocket of the party aggrieved; but where that is not possible, but the wrong is a public one, the penalty is public also. It would be impossible to hold that where the penalty is given to the individual there is no right of action, but where it is not so, as in the case of the fire-plugs, an action will lie; for then the result would be that persons who have paid for the water would have no right of action if injured by the failure to supply it, while those who have paid nothing would have their action against the company. I should therefore have thought independently of authority that the demurrer in this case should be allowed; and I do not think the authorities, when looked into, will alter that opinion. His lordship reviewed the authorities, throwing doubts on *Couch* v. *Steel* (3 E. and B. 402). On the question whether there was a contract between the parties his lordship expressed his opinion that that question had been properly left to the jury, and that the verdict ought not to be disturbed. It, therefore, became unnecessary to go into what his Lordship characterised as a most difficult question as to the meaning of the term 'unavoidable cause or accident.' The Lord Chief Justice and Lord Justice Baggallay concurred; the Lord Chief Justice, however, expressing some doubts as to whether there was not an implied contract between the parties to supply water to the hydrants on the statutory terms. The judgment on the whole case is, therefore, for the defendants.

DEVILLE *v.* THE HARROGATE COMMISSIONERS.

JUDGMENT in this case was delivered on June 26, by Mr. Justice Lopes on the rule obtained by the plaintiff, Dr. Titus Deville, against the defendants, the Harrogate Improvement Commissioners, to show cause why the verdict should not be entered up for the plaintiff for 25*l.* for which a verdict was taken by consent in the action at the last York Assizes, brought by the plaintiff for one quarter's salary, due to him as medical officer of health of Harrogate, he having continued to perform his duties for three months after having received notice of dismissal. His Lordship said this was an action brought by Dr. Titus Deville against the Harrogate Commissioners for the improvement of High and Low Harrogate, to recover a sum of 25*l.* for the quarter's salary. The jury at York, by consent, found a verdict for the sum claimed, and I reserved judgment, in order that I might consider the questions of law raised. The leading facts were as follows:—The plaintiff is a member of the Royal College of Physicians in England, and the defendants are the Commissioners for the improvement of High and Low Harrogate. On April 6, 1873, the plaintiff was appointed medical officer, and so continued until March 8, 1876, when the defendants passed the following resolution, 'That Titus Deville be re-appointed as medical officer for the year commencing April 6, next, at the same salary of 100*l.*; that a proper agreement be entered into for the performance for the duties of his office.' An agreement was drawn up, and which agreement was executed by the plaintiff but was not executed by the defendants. It was dated March 21, 1876, and the material parts are as follows:—'Provided always that the said urban sanitary authority may pay to and the said Titus Deville shall be bound to accept payment at the expiration of three calendar months of such proportion as they may think fit, on account of the said salary to which the said Titus Deville may become entitled at the end of any of the said quarters, provided always and it is hereby agreed between the parties hereunto that the said Titus Deville shall hold office as medical officer of health for the said district, until April 6, 1877, or until he shall die, resign, or be removed by the said urban sanitary authority, with the assent of the Local Government Board; provided also and it is hereby further agreed that whether any change in the extent of the district, for which the said Titus Deville has been appointed medical officer of health, or in his duties, salary or remuneration may, in the opinion of the said urban sanitary authority or Local Government Board be deemed necessary, and the said Titus Deville shall decline to acquiesce therein, then the said urban sanitary authority may with consent of the Local Government Board previously obtained, but not otherwise, and after six months' notice in writing signed by their clerk, and given to the said Titus Deville, or left at his usual place of abode, determine his said office of medical officer of health for the said district; or if the said urban sanitary authority shall at any time be desirous to put an end to this contract, and shall give twenty-eight days' notice in writing.' This is the material part, signed by their clerk, of their intentions so to do to the said Titus Deville, 'or if the said Titus Deville shall in like manner give such notice in writing to the clerk to the said urban sanitary authority, this agreement shall, on the expiration of either of such notices as aforesaid, cease and determine.' That being the agreement signed on March 21, 1876. On March 16, Mr. Bateson, who was the clerk to the defendants, wrote this letter to the Local Government Board:—'My Lords and Gentlemen,—I am directed by the Harrowgate Improvement Commissioners and Local Board of Health to state that they have, subject to the sanction of the Local Government Board, appointed Dr. Titus Deville as medical officer of health for one year ending April 6, 1877, and to request that you will be good enongh to furnish me with the necessary form of queries relative to such appointment.' On March 22 the usual list of queries and answers was submitted to the Local Government Board, but it is unnecessary that I should refer to them here, and on April 1, Mr. Bateson, clerk to the defendants, wrote this letter to the Local Government Board:—'My Lords and Gentlemen,—I am directed by the Harrowgate Commissioners and Local Board of Health to forward to you the accompanying form of queries duly filled up and signed relative to the appointment of Dr. Titus Deville and Mr. John Howard, as medical officer of health and inspector of nuisances respectively, which I trust may be found correct.' On April 5 Mr. Bateson wrote this letter: 'My Lords and Gentlemen,—I have to acknowledge receipt of your letter of the 1st instant, to state that Dr. Deville has been unable, on account of circumstances over which he had no control, to forward his report, and to state that the same shall be forwarded without fail during the present week.' The report mentioned in this letter was afterwards sent, and the Local Government Board after this treated the plaintiff and addressed him as medical officer of health for the district, and in letters which they wrote to him addressed him in that capacity. The defendants, on May 16, 1876, gave the plaintiff twenty-eight days' notice in writing to put an end to the said appointment. The plaintiff, up to June 22, 1876, received his salary. The defendants have since that date refused to recognise the plaintiff as their medical officer, and refuse to pay him his salary, due September 29, and it is in respect of this quarter's salary, 25*l.*, that this action was brought. The Local Government Board, however, have not approved nor sanctioned the removal of the plaintiff from being the medical officer. The plaintiff, since June 22, has duly sent reports of the sanitary condition of the district to the defendants and to the Local Government Board; the former have refused to receive such reports, but the Local Government Board have accepted them. These being the leading facts of the case, the question is, was plaintiff duly appointed, and if duly appointed, was he duly removed; the sanction of the Local Government Board for his removal not having been previously obtained. It was contended by the defendants that the plaintiff's appointment must be under seal. Having regard to the statute and the order of November

11, 1872, I am of opinion that a contract under seal is not necessary for the appointment of a medical officer of health. I think the plaintiff was duly appointed under the statute and order. If he was duly appointed under the statute and order, the further question arises whether plaintiff could be removed without the sanction of the Local Government Board. I think he could not, and that he is entitled to 25*l.* for which he sues in this action. It was further contended by the defendants that if the plaintiff was appointed, it was by virtue of the agreement of March 21, and that being so appointed under that agreement, he was legally dismissed by the 28 days' notice. I think this was an agreement which the defendants had no power to make. It was not approved by the Local Government Board, and the further difficulty arises that the plaintiff was dismissed without the sanction of the Local Government Board. That being the case, there will be judgment for the plaintiff for 25*l.*

Mr. Digby Seymour: With costs, my lord?

Mr. Justice Lopes: They will follow.

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

PRIVATE AND PUBLIC SEWERS.

(*To the Editor of the* SANITARY RECORD.)

SIR,—I venture to call attention through your columns to a subject the wide-spread interest and importance of which can hardly be over-estimated.

It refers to the present definition of the law in regard to sewers that are declared to be private property, and such as are vested in local sanitary authorities. The importance of the difference will be seen in the fact that for the condition of the former private owners are responsible, but of the latter, local boards.

As to a covered drain which communicates between a single private house and a public sewer no difficulty arises. Such a branch sewer is called a 'private connection.' But when only two houses, or two or more, but two are sufficient, communicate with the sewer by a common pipe, that pipe becomes the property of, and is vested in, the local authority. This is true of all such pipes either present or future. (See definition of terms, 'drain' and 'sewer,' and Section 13 of the Public Health Act.)

But on referring to the definition of terms which precedes the Public Health Act, under the word 'drain,' it will be seen that there is an exception to the above rule. It is not necessary for me to say whether the rule is a wise or an unwise one. But the exception should be carefully noted, and my desire is to show that its definition is ambiguous, and its effect upon the future building of houses, especially small ones, or such as give the most trouble in sanitary respects, may be and is likely to be unfortunate.

The exception to a sewer which conveys the drainage of two or more houses being a public sewer is, if such 'premises are within the same curtilage.' That is to say, a common pipe may convey to the sewer the drainage of a score of houses 'in the same curtilage,' and that pipe will remain private property, and will not vest in the local board. And this will be true according to the Act, though the score of houses 'in the same curtilage' may have as many different owners. And the converse will be likewise true, namely, that two or three houses may be built upon a far better plan, so as to give to each house a separate curtilage, and these two or three houses may belong to the same owner, but the common pipe conveying the drainage of these premises to the sewer vests in, and is, he property of the health authority.

Let me first point out the ambiguity of the distinction as thus expressed in the statute. For this purpose I must quote the entire definition of the word drain. 'Drain means any drain of and used for the drainage of one building only, or premises within the same curtilage, and made merely for the purpose of communicating therefrom with a cesspool or other like receptacle for drainage, or with a sewer into which the drainage of two or more buildings or premises occupied by different persons is conveyed.'

Without referring to books of note on the meaning of law terms, which give us no assistance in this instance, I may say that the common interpretation of the previous clause as applied to practical purposes is that houses with a common yard space are houses in the same curtilage, and, therefore, houses whose common drainage-pipe conducting to the sewer becomes chargeable for repairs to private owners and not to the Board. On the other hand I am desirous to submit that the meaning of the clause bears reference rather to a variety of premises, in one occupancy, in one yard-space which may be ample, or only such as is required by all local by-laws and is attached to each dwelling for the purpose of securing 'a free circulation of air.'

In support of this view I would point (1) to the substitution of the word 'premises' for 'building' in the excepting phrase. Lawyers are not generally sparing in the multiplication of words. But the ambiguity would have been removed if the act had said 'for the drainage of one *house or* building *or premises*, or *houses or buildings or* premises within the same curtilage.' The words in italics are those which I have ventured to insert. If the word 'premises' does not refer to other erections, such as stables or cow or pig places, why change the word previously used—'building'? And (2) this view receives confirmation from the words at the end of the clause referring to the sewer to which the drain leads as one, 'into which the drainage of two or more buildings or premises *occupied by different persons* is conveyed.' Why, if the premises within the same curtilage are not of such a character as I have stated, but are distinct human habitations, they are already 'occupied by different persons,' and the common pipe is, to all intents and purposes, a sewer. (3) According to this view, the curtilage of a house would not be a yard-area, common as an air-space to a group of houses, but at the same time made up of a number of required spaces which are the curtilages legally necessary for each, and are only made into what has the appearance of a single curtilage by the fact that the required area for each is not railed off.

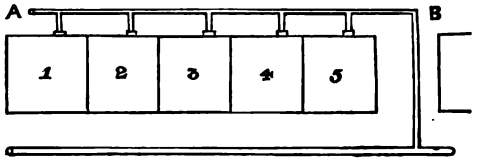
And now to show the disastrous effect of the existing law as generally understood. Let it be premised that it may be readily conceived how builders are desirous that their drains should vest in the board, upon whom would devolve all future works of repair, and that local boards (unwisely, I think) from the same motive are equally anxious to be rid of such an undefined accumulation to their responsibilities and expenses.

In the first place, we have before us the palpable injustice that houses should be differently situated in regard to the law according to the accident of their location. If houses are badly arranged, in the fashion of confined courts, the board is not the custodian of their sewer. If they are spread out in line, with open ventilation, the repair of the sewer is chargeable to the board, and the object of the board becomes so to arrange the drainage that this liability may be avoided.

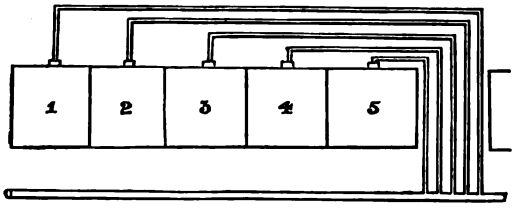
I will not say that encouragement is thus given to the sanctioning of court-erections, because such *cul-de-sac* arrangements of houses are now usually forbidden by other by-laws. But the inequality should not exist. The intention of the Act in this matter has no reference to the walling off or non-walling off of a house's proper air-space. Where buildings are not in the same occupancy, but constitute distinct habitations 'occupied by different persons,' the joint-pipe conveying their drainage is a sewer, irrespective of the arrangement of the dwellings,

and should (according to the existing law) vest in the board. I am not saying, as I intimated before, whether the law as laid down in section 13 is wise or unwise. But if it be right of two handsome edifices, built in a line and not in a 'curtilage,' that their pipe leading to the sewer should vest in the Board, it cannot but be right that the pipe from a rookery of court-cottages should vest likewise in the same proprietorship.

In order to show how local boards of health are acting in order to free themselves from liability as allowed by the existing law, I must give an instance which, I dare say, has not been of infrequent occurrence.



In the above sketch we have represented a row of five small houses, which it is proposed to erect in a street where a sewer is already laid down in the front of the houses. The closets are properly placed at the back and outside the house. It is obviously most undesirable to convey the soil-pipe underneath each house, so that each may thus form a 'private connection' with the sewer. The plan which I have sketched above is that which regard for safety and common sense would suggest. But it will be seen that the pipe A B, after leaving house No. 2, becomes a sewer, according to the present statute, and as such would vest in the board. An alteration is therefore required to be made as follows:



By this ingenious, but most unwise arrangement, it is true that additional private cost, risk, and inconvenience are occasioned; but those who, as representatives of rate-payers, are properly concerned in keeping down the rates, are led to flatter themselves that they are thus keeping them down, and doing it under the sanction and according to the intention of the law for that purpose expressly provided.

I have been referred by a high authority to the proviso in section 23, as empowering the local board to forbid so absurd an arrangement as here proposed, and in many places, to my knowledge, adopted. But such a reference implies an entire misunderstanding of the case. No builder could ever submit such a plan. Indeed, a plan of this kind could only originate with a local authority, and could only be contrived for the express purpose of getting rid of future contingent expenditure by Act of Parliament.

I need hardly add that such deductions, as the result of sanitary law, lead to great dissatisfaction on the part of builders, to the accomplishment of bad instead of the promotion of good work, and to a general discrediting of the whole department, which medical officers of health are deputed to represent.

I write in the hope that you, Mr. Editor, or some of your readers, may be able to throw some light upon this subject.

JOHN MAKINSON FOX,
Medical Officer of Health.

Cockermouth, June, 1877.

P.S.—I shall be prepared in a future communication o give my opinion, from a practical point of view, as to the wisdom or unwisdom of the present state of the law in this matter.

PATENT SANITATION.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Letters and claims have lately appeared in the SANITARY RECORD respecting two patents for improvements in house drainage. The first consists in putting a drain trap in the line of the drain with a vertical drop from the drain into the trap, and an inlet from the surface over the trap for admitting fresh air into and through the drain. The second consists in putting a tipping trap at the foot, and an extracting cowl at the top, of the soil-pipe, leading an air-pipe into the soil-pipe above the trap, and using trapless closets and sinks in connection with this arrangement.

As regards the first patent. There is nothing novel in this trap, which is similar in principle to a brick trap, fig. 1, that was in vogue in connection with brick drains thirty years ago, when stoneware pipes were first employed in the metropolis for house drains and sewers. Since that time this trap has not been used except on special occasions. Its inlet at A was generally from three to twelve inches above the outlet at B, and frequently over the inlet at A a brick shaft, A C, was formed, with a stone and grating at top level with the area or yard surface. From this it will be seen that by the drop at A the water acquired a force which not only broke up the soil floating in the trap, and carried it under the dip at D into the outlet at B, but agitated the water in the trap, and prevented soil from depositing therein; and by the shaft A C fresh air was admitted from the surface into the drain as indicated by the arrows.

The stoneware trap which is usually laid in the line of the drain has the inlet on the same level as the outlet. This is a mistake, for the water carrying the soil gradually passes away from under the dip, leaving the soil floating behind in the trap. Here it remains until it decomposes or dissolves, and while this process is going on effluvium is generated which rises up the drain and soil-pipe to the traps under the closets and sinks. Through these traps it escapes into the house when no vent-pipe is provided from the top of the drain or the soil-pipe to relieve the traps of its pressure when it is expanded by hot water poured down a sink or discharged from a bath.

The retention of soil and the generation of effluvium in a drain-trap may be nearly altogether prevented by making it as represented in fig. 2, the inlet at A being

FIG. 1.

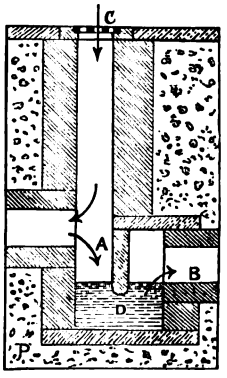
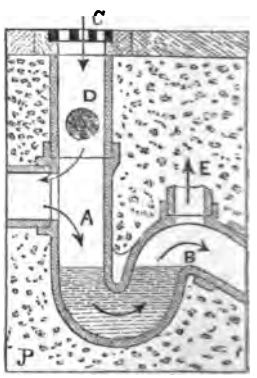


FIG. 2.



about six inches above the outlet at B. This trap should be laid in the line of the drain between the house and the sewer. By its means direct communication with the sewer would be severed; and by the pipe which is carried from over the inlet at A up to the surface at C, with a stone and grating at top, the drain would practically discharge into the open air. Proper syphon traps should be placed under all closets and sinks communicating with the drain or soil-pipe, from the top of which not less than a four-inch ventilating pipe should be continued above the roof. By this arrangement fresh air would be always flowing into

and through the drain and soil-pipe, and the house would be kept perfectly free from effluvium.

The junction at D, fig. 2, is for receiving a pipe from a sink, closet, or bath situate on the side of the house where the drain A does not run. This pipe is usually made to discharge over a grating C, but it would be more cleanly if it discharged under the grating, where its outlet would be still open to the atmosphere. The water falling into the trap from this pipe would also assist in keeping the trap clear of deposit. The junction at E is for carrying a ventilating pipe from the drain between the trap and the sewer, and so relieving the trap from the pressure of sewer air which occurs daily as the drainage rises in and fills the sewer. It is a moot question where this pipe should discharge itself. As it ventilates the sewer as well as the drain, people object to it being carried up the front to the top of the house. It may be curved over from the junction at E and connected with a pipe specially laid under the middle of the street for receiving it, with gratings communicating with the surface. By this plan the drain between the sewer and the trap in front of the house, and the sewer itself, would be ventilated, and sewer gas prevented from getting into the house by the drain.

As regards the second patent. There is nothing novel in this system except the extracting cowl and the trapless closets and sinks. The latter arrangement, to say the least of it, is the very reverse of sanitary. For example, all soil-pipes and drains become more or less furred, soiled, or coated with organic matter. Consequently the effluvium emanating therefrom, as also from the sewage itself while passing down the soil-pipes and drains, will escape into the houses through the trapless closets and sinks, even when ventilating pipes with cowls are placed upon the top of the soil-pipes. The escape of effluvium at the places referred to will be more intense at night when gas and fires are burning, and the doors and windows are closed. Hence it is obvious that where this system is in action in houses, the inhabitants must be always breathing a contaminated atmosphere.

The plan of leading fresh air into the soil-pipe above the tip trap placed at the bottom is no novelty. To my knowledge it has been practised for at least twenty-five years. I remember one example as far back as this, which was carried out in a London workhouse. It consisted in leading air through gratings and pipes into the bottom of three stacks of soil-pipes just above where they discharged into yard-traps outside the closet walls. The soil-pipes were continued above the roofs with raised conical covers fixed upon them. Numerous other cases may be cited. As regards the patent extracting cowl, a description of its action and application may be seen by reference to Ewbank's 'Hydraulics and Mechanics,' 15th edition, p. 488.

JOHN PHILLIPS,
Sanitary Engineer.

Putney, Surrey, June, 1877.

Sanitary Invention.

BRISTOWE'S CARBOLIC SOAPS.

CARBOLIC soaps are now so generally used for hospital, disinfecting and cleansing purposes that any special dissertation on the valuable properties of their distinguishing component, carbolic acid, would be simply a work of supererogation. Messrs. Bristowe's carbolic soaps may be mentioned as excellent of the kind. The base soap is of the best quality, and the carbolic acid in combination of the purest kind and in proper quantity. For all persons who have to deal with the sick, whether in infectious or chronic cases, the carbolic toilet soap is highly to be recommended, the characteristic and, to some persons, unpleasant odour of the carbolic acid being skilfully masked by an appropriate perfume, without detracting from its antiseptic qualities. For washing floors, walls, and household linen in private houses, infirmaries, hospitals, and workhouses, the carbolic sanitary soap will be found to be a powerful detergent and deodorant.

Notices of Meetings.

THE METEOROLOGICAL SOCIETY.

THE last meeting of this society for the present session was held on Wednesday, the 20th ult. at the Institution of Civil Engineers, Mr. H. S. Eaton, M.A., President in the chair.

Henry Hearder and Henry Law, M. Inst. C.E., were balloted for and duly elected Fellows of the Society.

The following papers were read :—

'On an Improvement in the Mechanism of Self-recording Meteorological Instruments' by the Rev. C. J. Taylor. In order to obviate sluggishness in self-recording aneroids on ordinary small bore mercurial barometers, the author places a small electric apparatus, from which the bell had been removed, so that the clapper when it acts shall strike on the top of the vertical brass bar on which the recording pencil stands; by this means a very rapid succession of light taps can be administered at a pace which affects all the movable parts of the mechanism.

'Results derived from the Sunshine Records obtained at the Royal Observatory, Greenwich, by means of Campbell's Self-registering Sun-Dial, during the year ending April, 1877.' By William Ellis, F.R.A.S. The instrument consists of a very accurately formed sphere of glass, four inches diameter, supported concentrically within a well turned hemispherical metal bowl in such a manner that the image of the sun formed when the sun shines, falls always on the concave surface of the bowl. A strip of some material being fixed in the bowl, the sun when shining burns away the material at the points at which the image successively falls, by which means a record of periods of sunshine is obtained. The duration of sunshine in hours for each month of the year ending April 30, (excepting from May 30 to July 31, and October 27 to 31) was as follows :—

	hrs.		hrs.		hrs.		hrs.
May	152·3	Aug.	216·9	Nov.	35·9	Feb.	36·4
June	184·5	Sept.	106·1	Dec.	6·5	Mar.	99·3
July	214·3	Oct.	47·3	Jan.	18·7	April	71·3

One of the most remarkable periods was August 7 to 14, the duration having exceeded 10 hours on every day during this time. It appears that in the months of August, September, and October, the mean maximum and minimum temperatures were both, on the average, higher on days of greater sunshine than on days of lesser sunshine, whilst in the months of January and February, an exactly opposite condition existed. In the remaining months the mean maximum temperature of the greater sunshine group was higher, and its mean minimum lower, than the corresponding mean maximum and minimum temperatures of the lesser sunshine group. It also appears that there was more sunshine after noon than before noon in every month, except August, March, and April.

'On the Diurnal Variation of the Barometer at the Royal Observatory, Greenwich,' by W. Ellis, F.R.A.S. The Astronomer Royal having communicated the numerical values of the variations of the barometer, as deduced from the photographic records at the Royal Observatory during the twenty years ending 1873, the author adds a few general remarks thereon. Comparing together the different months of the year, it is observed that the morning minimum and the forenoon maximum both occur earlier as the year advances; they are earliest in summer, and become later again on the approach of winter. The afternoon minimum and evening maximum on the contrary, occur later as the year advances; are latest in summer, and become earlier again towards the end of the year. They

all change in a certain degree with the change in the times of sunrise and sunset. As a consequence of this the intervals between the morning minimum and the forenoon maximum, and between the afternoon minimum and evening maximum, do not change very much through the year, whilst that between the forenoon maximum and afternoon minimum is much shorter in winter than in summer, and that between the evening maximum and morning minimum is much longer in winter than in summer.

'On the Rainfall of Jamaica during the Seven Years 1870-76,' by Griffith, N. A.; 'Contributions to the Meteorology of Cannes,' by William Marcet, M.D., F.R.S. Mr. Marriott exhibited and described Bogen's Hygrometer and new Standard Siphon Barometer. The barometer possesses the following special features. It is so constructed that it can easily be put together and taken to pieces again. The long leg consists of a tube of the same diameter throughout, and is supplied with a glass stopper, which has a very fine bore passing through its centre, enabling one to fill the tube with mercury in one or two minutes, and to completely exhaust it of air in one or two minutes more. The open end of the long leg is ground air-tight to the short (curved) leg, and can be instantaneously put together or separated. The long tube alone is graduated so as to have only one scale, but by a peculiarly constructed screw of given length placed on the short tube, a precise and accurate reading can be easily obtained. The barometer is mounted on a peculiarly shaped stand, which has three adjusting screws, by means of which the perpendicularity of the instrument can be ensured.

THE BRITISH MEDICAL ASSOCIATION.

THE next Congress of this Association will be held in Manchester, at Owens College, on the 7th, 8th, 9th, and 10th of August. The President-elect is Dr. M. A. Eason Wilkinson, senior physician to the Manchester Royal Infirmary, and the readers of addresses will be Dr. William Roberts, F.R.S., who will give the address on medicine; Mr. T. Spencer Wells, F.R.S., will give that on surgery, and Dr. Robert Barnes, F.R.C.P., who will give that on obstetric medicine. There will be many foreign visitors, amongst others MM. Charcot, Worms, Loilet, Ollier, Chauveau (Paris), Bamberger (Vienna), Ludwig (Leipsic), Herman (Zurich), Roussell (Geneva), and Marion Sims (New York). Sir William Jenner is the Presidentof the Medicine Section, Mr. E. Lund of the Surgery, Dr. W. O. Priestly of the Obstetric Medicine, Surgeon-Major F. S. B. De Chaumont of the Public Medicine, Dr. Arthur Gamgee of the Physiology, and Dr. J. C. Bucknill of Psychology. Manchester will give the Association a public welcome and there will be much private hospitality. The Association has twice before visited this city—in 1836 and in 1854. On the first occasion the Association numbered 600 members, on the second 2,000, while this year it comprises upwards of 7,000 of the leading practitioners in the United Kingdom.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

BARRETT, Caleb, F.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the No. 4 Sub-District of the Bath Rural Sanitary District, vice Biggs, resigned.

CRASKE, Edmund J., Esq., has been appointed Treasurer to the Eton Guardians and Rural Sanitary Authority, vice the Hon. Leslie Ruthven, deceased.

DENNEY, Mr. Henry, has been reappointed Inspector of Nuisances for the Erpingham Rural Sanitary District, Norfolk, for one year.

GIBSON, Mr. William, has been appointed Assistant Surveyor to the Withington Local Board and Urban Sanitary Authority, Lancashire, at 150*l.* per ann.

HOLYOAKE, Mr. William John, has been appointed Clerk to the Ludlow Guardians, Rural Sanitary Authority, etc., vice Davies, resigned.

KERRIDGE, Mr. Henry, has been appointed Inspector of Nuisances for the Bosmere and Claydon Rural Sanitary District, Suffolk.

MCGHIE, Thomas, Esq., has been appointed Chairman of the Cannock Local Board and Urban Sanitary Authority.

NIXON, Mr. William, has been appointed Inspector of Nuisances for the Elland Urban Sanitary District, Yorkshire, vice Eastwood, resigned.

PECKOVER, Algernon, Esq., has been appointed Treasurer to the Wisbech Local Board and Urban Sanitary Authority, Cambridgeshire.

PYM, Mr. Joseph, has been appointed Clerk to the Belper Local Board and Urban Sanitary Authority.

ROBINSON, Mr. Arthur Sidney, has been reappointed Surveyor at 40*l.* per ann. and Inspector of Nuisances at 160*l.* per ann. to the Newtown and Llanllwchaiarn Local Board and Urban Sanitary Authority, Montgomeryshire.

SMITH, Mr. Thomas, has been appointed Clerk *pro tem.* to the Cannock Local Board and Urban Sanitary Authority.

THOMS, Mr. G. Eastlake, C.E., has been appointed Engineer and Surveyor to the Corporation and Urban Sanitary Authority of Wolverhampton, vice Morgan, deceased, at 500*l.* per ann.

VACANCIES.

ACTON LOCAL BOARD AND URBAN SANITARY AUTHORITY, Middlesex. Surveyor: 150*l.* per ann. Application, 9th instant, to Francis Hamilton, Esq., Friars Place, Acton, W.

ELLESMERE RURAL SANITARY DISTRICT. Inspector of Nuisances: 52*l.* per ann. Application, 9th instant, to John P. Stant, Clerk to the Authority.

GREAT CROSBY LOCAL BOARD AND URBAN SANITARY AUTHORITY, Lancashire. Surveyor and Inspector of Nuisances.

NANTWICH GUARDIANS AND RURAL SANITARY AUTHORITY, Cheshire. Clerk.

SAMFORD RURAL SANITARY DISTRICT, Suffolk. Inspector of Nuisances.

SANITARY PATENTS.

2020. Improvements in traps for preventing the escape of gas and noxious vapours from sewers, drains, pipes, closet pans, and such like places. Herbert John Haddon, Strand London. A communication from Buckland Palmer Bower and John Joseph McEvoy, Cleveland, Ohio, U.S.

2102. Improvements in ventilation, and in new or improved appliances or apparatus therefor and connected therewith. William Paton Buchan, Glasgow, Lanarkshire, N.B.

2103. Improvements in apparatus or machinery for ventilating mines, shafts, and tunnels. William Henry Thwaites, and Alexander Stewart, Bradford, Yorkshire. Partly a communication from Edward Hamer Carbutt, Bradford, Yorkshire.

2111. Improvements in apparatus for cleaning boots and shoes. Francis Edwin Wiggins, St. James' Street, London.

2121. Improvements in vermin traps. Alfred Notcutt, Ipswich, and George Scopes, Needham Market, Suffolk.

2125. Improved mechanical arrangement for preventing waste and regulating the flow of water, specially useful for water closets. William Mills Smeaton, Newcastle Street, Strand, London.

2141. An improved travelling water closet. Etienne Pitrot, Boulevard de Strasbourg, Paris.

ABSTRACTS OF SPECIFICATIONS.

3640. Disinfecting Clothing. C. E. H. Rogers.
This consists mainly in placing the clothes in an iron hot chest surrounded by a casting mounted on wheels and provided with a fire-grate beneath. The hot chest is covered with a box lid into which the clothes are first placed, and from which they drop by pulling some slides when the box is placed over the hot chest.

3743. Distilling water. J. M. Kendrick and J. W. Ball.
This consists in a modification of the aerator connected to the worm or condenser—see No. 2,853, 1862. The case is made larger, and one or more air inlet or combining nozzles are added below, the first under the steam inlet nozzle, with a separate air chamber at the top of each formed by two rings with corresponding apertures, movable on each other.

3868. Drain pipes. A. Taylor.
In lieu of the ordinary flanges, plain bands or rims are added to the ends of the pipes, bevelled like the rim of a cotton reel, so as to fit into a groove in the centre of a chain and saddle arrangement placed round them. No cement is needed.

3902. Medicated sweetmeats. M. Lyons.
This consists in mixing with one pound of sugar 128 minimum doses of any medicinal substances, adding otto of roses or other flavouring substance, then a harmless colouring matter, in boiling and making sweetmeats.

NOTICE.

THE SANITARY RECORD *is published every Friday morning, and may be ordered direct from the Publishers. Annual Subscription, 17s. 4d.; free by post, 19s. 6d,*

Reading Covers to hold 12 *numbers of* THE SANITARY RECORD *have been prepared, and may be had direct from the Publishers or through any Bookseller, price* 3s.

Original Papers.

THE WATER-SUPPLY OF TILBURY FORT.

IT is very satisfactory to learn that a most judicious step has recently been taken by the War Department for the improvement of the water-supply at Tilbury Fort.

That it was urgently required and has not been prematurely taken may be gathered from a report on the prevalence of ague and malaria at the Fort in connection with its water-supply, which is to be found in one of the appendices to the recently published report of the Army Medical Department for 1875. The men then stationed there used rain water collected from the roofs of the various buildings, and stored in two tanks underground, one of which (the old tank) held 24,000 gallons.

The tanks, which were of cement, communicated, but each had a distinct collecting ground, as well as a separate filter of charcoal and gravel.

These filters were built in 1873, prior to which date there was no way of purifying the tank water.

It may be observed that the receptacles in which the water was stored were neither of them within ninety yards of the Thames.

Such being, then, the conditions of the water-supply for drinking and general domestic purposes, this station in the Essex marshes was found so unhealthy that of late years the troops had to be relieved every six months; and that the unhealthiness was distinctly to be traced to the quality of the water is proved beyond all question from the following statements by the medical officer who wrote the report.

In 1873 the tanks were undergoing repair and cleansing, which operations lasted until July in the following year, and during the whole of this time a battery of artillery quartered in the fort obtained water for cooking and drinking from the neighbouring railway-station, which is supplied with spring-water from an ordinary well at Low Street, a station on the Tilbury and Southend Railway.

The average strength of the battery during this period was ninety men, amongst whom only a single slight case of ague occurred, and that soon after the arrival of the battery at the fort.

Before this force came to Tilbury, in the earlier months of 1873, another battery of the same brigade was quartered there, and in it there were twelve cases of ague, the average strength being 102 men.

In the first half of 1872 a battery of similar strength had thirty-four admissions to hospital from ague, and in the latter part of 1874 four cases of the disease took place in a half-battery consisting of fifty-three men before they had served much more than half the prescribed time at the station.

Two of the men attacked by the disease (none of whom had before suffered from it though they had been serving at Gibraltar) were so much debilitated by malaria that they had to be sent on furlough.

Thus it appears that in 1872, in the first six months of 1873, and the latter part of 1874, the troops at Tilbury suffered considerably from ague, tank water being during those periods used for purposes of diet, whereas in the end of 1873 and commencement of 1874, when spring water was supplied to the men, there was only one slight case of sickness of this kind.

The inference as to the cause of the disease is plain enough, but there is yet stronger evidence that unmistakably points to the water-supply as the *fons et origo mali*.

Though there is no rural population near the fort with whose sanitary condition that of the soldiers can be compared, there are ten men with women and children, belonging to the Coast Guard, living in a watch vessel lying in the river mud just outside its walls, and some sixty men attached to the railway, who, with their families, occupy houses in the immediate vicinity. Both the Coast Guard men and the railway *employés* have been from one to five years in the place, yet none of them have been known to suffer from malaria, and a case of ague is very uncommon.

Now, whatever may be the case with respect to the houses in which the railway men live, there can be little doubt that the abode of the Coast Guard would be generally considered as one which ague and malaria might be expected to visit, but these men may be said to enjoy complete immunity from these evils.

How is this to be accounted for? Simply from the fact that they consume the spring water.

There could be no other cause for the sickness amongst the soldiers than the impurity of the water they used, for when they were placed under the same conditions with regard to water-supply as the only other residents at the station, their health was equally good.

An analysis of the tank-water was made in 1874, when it was shown to be very impure, and highly charged with organic matter, yet in the face of this analysis the water was again taken into use. The source from which the spring water comes is about 1½ miles from Tilbury, at the foot of some low-lying hills, whence the water without any difficulty is conveyed to the Fort.

It is stated that some years ago it was purposed to lay pipes from this source to Tilbury, but the intention was for some reason or other abandoned, and up to the close of 1875 it was not resumed; but we are glad to find that the obstacle, whatever it was, has been surmounted, and that the troops now have a supply of pure water.

Surely then, when so much attention is paid to improving the water-supply in every centre of population, however small, it would have been culpable to allow considerations of economy to stand in the way of providing the little garrison at Tilbury with wholesome water, especially when it could be so easily placed within their reach.

The outlay that has been incurred will be more than repaid by the improvement in their health that will certainly be realised.

To be stationed in such a quarter must be sufficiently dreary, without having sickness to aggravate its wretchedness; but it may be expected that henceforth the disagreeables of the station will not be liable to be so augmented.

Our only wonder is that the alteration in the system of the water-supply has been so tardily effected; however, it is better that it should have been carried out late than not at all.

THROUGHOUT Scotland at Jan. 1, 1875, the number of pauper children boarded out was 4,512, among whom there was nearly an equality of boys and girls.

THE WATERING PLACES OF THE ISLE OF THANET.

RAMSGATE.— Considerable improvements are being made in this town to meet the requirements of the seaside visitors, but not nearly sufficient to make this more than a summer or rather fine weather place of resort. There is at present no reading-room or even large tent where visitors can take refuge from rain, the mid-day sun, or cold winds, so that delicate persons are compelled to remain indoors when they might otherwise be in the open air. This remark applies not only to Ramsgate, but to Margate and Westgate. There is, indeed, some talk of a row of shops being built on a piece of ground adjacent to the railway station and facing the sea, with a large room at the back and reading-rooms over; but this, as well as the connection of the two cliffs by a viaduct, has been for a long time on the *tapis*. The opening of the new Victoria Gardens adjacent to the Granville, of the new road leading from the cliffs opposite the Granville to the sand, and of the concert-hall below the gardens are certainly steps in the right direction, as for a small sum admission can be obtained to the gardens where a first-rate band plays every evening. There are not, however, sufficient seats there at present; and there is also no shelter against a sudden shower of rain or cold winds. The season is backward, and the tradesmen complaining. Considering the climate, there is no reason why this should not become a spring and late autumnal watering-place, as it is more sheltered than Margate and consequently warmer in the very hot weather.

MARGATE.—The chief addition that has lately been made here for the accommodation of visitors consists of the new landing-stage and promenade at the end of the old jetty. It is a strong structure, built of wood, supported by iron columns, and bound together by iron stays. The landing-place, which is below, is convenient, and the upper, which consists of a central part connected by six short bridges, with the outer hexagonal portion. There are plenty of seats, and kiosks where refreshments can be procured. A band plays here every week day, in the evening. Extensive additions have been made to the house accommodation, and a small structure erected on the Fort, in which shelter can be obtained. The air is more bracing than at Ramsgate, and therefore more suitable for some persons during the hot weather, but the water-supply, although better than it was, is still unequal to that of Ramsgate or Westgate. What it was may be seen by a reference to the SANITARY RECORD, September 16, 1876, when it was reported as containing suspended matter affording evidence of imperfect filtration.

WESTGATE.—This rising watering-place is rapidly increasing, as it now contains about 100 houses, a row of shops, and a fine hotel, the Beach House, at which capital accommodation can be had at moderate charges. There are a large number of bedrooms, which are charged for according to size and position, drawing-room, smoking-room, reading-room, dining-rooms, baths, and other conveniences, as well as a large lawn facing the sea. The beach is small, but the sand is firm, and the bathing good. Not any of the houses are built under the cliff, but they are protected to a certain extent by the rising ground from winds, excepting those which come from the sea, so that we should expect the climate to be intermediate between that of Margate and Ramsgate. The houses themselves are prettily built, as they possess a good deal of colour, and for the most part have balconies or verandahs, the latter being placed in front of the ground floor and first-floor rooms. There are but few small houses, and none for artisans, so that there is no accommodation for the poorer class of visitors. It is very quiet, and much frequented by families. It is intermediate between Margate and Birchington, being about a mile and a half from the former and two miles from the latter, so that if one is tired of quietness, Margate can be easily reached by rail, carriage, or on foot. A sloping promenade has just been finished which runs below the upper surface of the cliff and facing the sea, where invalids and others can walk and enjoy the sea breezes, but are protected from those coming from the land. There are, however, scarcely enough seats, which will probably soon be provided. We would also mention that the water-supply is derived from the chalk, and, as shown by the analysis published in the SANITARY RECORD of September 16, 1876, is good.

BIRCHINGTON.—A small straggling village about a quarter of a mile from the sea, little frequented by visitors, except those who desire economy and at the same time good sea air. There are no bathing machines, or hotels, as one so-called is but an inn. Some of the houses nearer the sea are somewhat picturesque, as the sitting rooms are built of wood with double roofs, whilst the bedrooms and offices have walls of brick. They are only one story high. Apartments can be had or plain accommodation at the so-called hotel.

BROADSTAIRS requires no special remark at present, as it remains nearly unchanged except that a large number of houses have lately been built, affording accommodation for a larger number of visitors.

THE SANITARY CONDITION OF IRELAND.*

JUDGING from this quarterly return of the Registrar-General, the sanitary condition of Ireland evidences an improvement. There is a diminution to the extent of 764 deaths in the zymotic or preventable diseases. The deaths registered in Ireland during the quarter ending June 30 last amounted to 25,602—12,799 being males and 12,803 being females—affording an annual ratio of one in every fifty, or 19·2 per 1,000 of the estimated population. The registered deaths in the province of Leinster show an annual death-rate of 21·9 in every 1,000 of the estimated population of the province. The rate in Munster was 19·1, in Ulster 19·2, and in Connaught 15·5 per 1,000. The following counties show the highest death-rates: Dublin heading the list with 24·3 per 1,000; Wexford, 23·5; Waterford, 23·4; Kilkenny, 23·3; Down, 22·0; Louth and Westmeath, each 21·4; Meath, 21·2; Armagh, 21·0. Those having the lowest death-rates were: Mayo, 13·6 per 1,000: Leitrim, 14·1; Fermanagh, 15·3; Roscommon, 15·4; Sligo, 15·6; Clare, 16·1; and Kerry, 16·9.

Taking the ages of those who died, of the 25,602 deaths registered during the last quarter, 3,411, or 13·3 per cent. were of children under one year old; and 10,556, or 41·2 per cent. were of persons aged sixty years and upwards. In the province of Leinster the number of deaths of children under one

* Reprinted from the *Irish Builder* of Oct. 1, 1876.

year old equalled 13·2 per cent. of the total registered therein; in Munster, 13·6 per cent.; in Ulster, 12·8 per cent.; in Connaught, 14·6 per cent. The deaths of persons sixty years old and upwards registered during the quarter in Leinster were equal to 38·8 per cent.; in Munster, 41·1 per cent.; in Ulster, 38·8 per cent.; and in Connaught to 47·1 per cent. of the total deaths registered in the province.

In the deaths from old age, there are several remarkable centenarians, whose great longevity would, no doubt, be looked upon with more than grave suspicion by Mr. Thoms, the London general *littérateur*, but centenarian sceptic. Thirteen persons are stated to have attained the age of 100 and upwards, one case being registered at the age of 113 in the Anascaul district, Dingle Union. The registrar of Broadford, Newcastle Union, reports the death of a woman at Glanduff, 'a widow, of the labouring class, at the advanced age of 108 years; she was of temperate habits, neither smoked nor snuffed; she maintained her intellect unclouded to the last, and walked a mile in perfect health a week before her death.' This remarkable old dame, supposing her baptismal certificate is attested, was born about the year 1768, and was fourteen years old when the Parliament of 1782 was established; thirty years old in the memorable Rebellion of 1798, seven years old when O'Connell was born, and has outlived him nearly thirty years, his centenary being only last year, though he died at a ripe age in 1847. Had the widow of Glanduff been of a literary cast of mind, what a gossiping volume of memories might she not have furnished us, for doubtless, though she neither smoked nor snuffed, she was fond of a strong cup of tea, and could divine the signs of the times in the grounds of the tea-leaves that encircled her cup when she chose to 'toss' it.

But to proceed. Of the deaths registered in the Tuosist district, Kenmare Union, the ages of five ranged from eighty to ninety years. In Belfast, where the deaths of children under one year of age registered during the quarter amounted to 223, and of persons sixty years of age and upwards to 109, the registrar of No. 10 district states that 'the action of burial societies makes the return of the ages of the old untrustworthy to a very serious extent. In order to obtain insurance at a low rate, the age of the party insured is, I believe, in many cases, grossly misrepresented.'

The registrar's statement may or may not be true; as it stands, however, it is a mere assertion, and steps should be taken to confirm it by bringing facts forward which would place the statement beyond all doubt. We find of the 30 registrars furnishing reports as to the sanitary condition of their several districts, 20 have reported favourably, and have also testified to the benefits resulting from the successful working of the provisions of the Sanitary Act.

It will, however, not be amiss on our part to glance over a number of the registrars' reports in different districts in the four provinces, as the evidence they furnish will show that the sanitary education of the people at large throughout the country is still in a very backward state. Many of the representatives of the people in local boards and unions have a personal interest in opposing sanitary reform, and officials under them are not independent enough to speak their minds. A faithful report would often go to prove that the greatest offenders against the sanitary laws are the members of local boards and guardians of the poor; but sanitary officers do not like to blurt out the truth about the evil doings of their masters. Some recent Local Government Board inquiries will prove the truth of our statements, as will also some forthcoming inquiries not a hundred miles distant.

At Tandragee, Lisburn district, there had been an epidemic fever, mostly typhoid, during the last quarter; the water was bad, and the houses filthy. At Coagh, in the Cookstown district, there were also several cases of typhus and typhoid; some of the houses where it occurred were in a most uncleanly state. At Stewartstown, in the same district, there is an improvement; though we learn that they were in the habit previously of using the water obtained out of an old sewer. Other places in the Lisburn district suffered from zymotic diseases, but some improvement is evidenced of late. Scarlatina has been prevalent at Waringstown, in the Lurgan district, but the place is now on the mend.

The condition of Newry is favourably spoken of, there being a desire of late to carry out the provisions of the sanitary acts; still some cases of fever are reported. In part of Newtownards the town pumps are out of order, and the people, as a consequence, are using bad water. The registrar writes: 'Newtownards did not adopt the "supply of water" clause of the Towns Improvement Act, 1854. I have advised that the 11th and 12th clauses of the Sanitary Act, 1866, give them, and were designed to give them, and the commissioners of all the towns which had not adopted the supply of water clauses of the Towns Improvement Act, power as to sewer authority, to put on a sewer rate, and use it for the purpose of supplying the town with water.' The commissioners, however, are reported as not taking the advice, though plenty of pure water exists under the soil. At Gweedore scarlatina still continues, and in a malignant form—scarcely a part of the district escaping. Throughout the Irvinestown district in several places scarlatina has been prevalent, and the baleful custom of holding 'wakes' has helped to spread the disease. At Eglinton, in the Londonderry district, scarlatina has also been prevalent and widely extended. The sanitary condition of the district, as might be expected, is generally bad, and there is little desire evinced to conform to the law. At Carlingford the sanitary state of the district is improving. At Kells, not long since notorious for its bad state, no single case of infectious disease is reported. Sanitary matters at Naas are being carried out slowly. At Castlelane, in the Navan district, there were some malignant cases of scarlatina. Good water is reported scarce, but it is pleasing to see that the Sanitary Act is working well. At Rathdrum forty-seven cases of typhoid fever were admitted into the fever hospital, and as many more were attended in their own houses during the quarter. At Enfield, Trim district, the sanitary state is reported good, but many of the dwellings of the labouring class are unfit for habitation. Scarlatina and measles are prevalent at Enfield and neighbourhood.

At Roscommon the sewerage in places is described as in a most imperfect state. The nuisance has been repeatedly brought under the attention of the sanitary authorities, but they do not move. The sewerage of the town requires a thorough remodelling. At Abbeyleix scarlatina has been prevalent. A man, a labourer, who died in this town, is reported to have

been 105 years old. At Carlow typhoid has been prevalent; children particularly have suffered. At Fethard typhoid and typhus have been prevalent for three months. At Emo, Mountmellick, though the condition of the district is reported as improving, the registrar states he has some difficulty in preventing accumulations of manure heaps at the cabin doors, and the cabins are too small and badly ventilated. At Clifden the death-rate has been higher, but the district is reported as improving. At Loughrea the water is still bad, but the authorities have succeeded in preventing the pigs, as heretofore, being housed in the dwellings of the people. At Craggaknock, Kilrush district, typhus fever has been prevalent. At Achill, Newport district, filth, bad drainage and ventilation, as usual, show the results in the prevalence of typhus. Here the inhabitants, for the most part, are reported to live in large villages, a large number of persons dwelling in each hovel, in which they also kept their cattle and pigs. Lime is difficult to procure, none being said to exist in the district. The Union Fever Hospital is thirty-two miles distant, part of which distance has to be performed in boats. The consequence is that the infected are not sent to hospital, but remain to infect others. The remuneration paid to the sanitary officer is reported as 'wholly inadequate to the amount of work required in the district, which, if conscientiously performed, would be little short of a herculean labour.' The registrar, in his last report, states his relations with the district, as medical and sanitary officer, have ceased. Poor Achill! always in poverty. You have been visited, preached to and lectured by missionaries of all kinds, but your great need is not the Gospel alone, but profitable, industrial employment and habitable dwellings.

In Carrick-on-Suir district, at Portlaw, the mortality has been excessive; ten deaths were from acute pneumonia, chiefly of the typhoid character, traceable to unhealthy homes and surroundings. At Enniscorthy a great deal of the mortality is attributed to the defective sewerage and the want of healthy human dwellings. At Ballyhowley, Fermoy district, typhoid fever is prevalent. There is a school of over 300 who have no water to drink save out of old and badly-cleaned barrels. Cases or groups of cases are traced by the registrar to this cause.

The Lodger Act which is being enforced at Kilmacthomas is checking overcrowding, and, of course, promoting domestic cleanliness. There is a lack of places of accommodation. We fear this will long continue over the country districts, when we find some would-be architects and surveyors actively planning houses, and superintending their erection, without providing the rudest form of closets or privies. In Waterford, Kilmakevoge, the rate of mortality is high. The sanitary authority is said to afford every facility in carrying out the provisions of the sanitary Acts, and, where suitable dwellings have been erected for the labouring class, longevity and absence of disease is observable.

In Cork, No. 7 district is reported free from contagious diseases, but the county gaol nuisance remains unabated. The rural sanitary authority have referred the matter to the urban sanitary authority, and the latter have appointed a special committee to inquire into the matter, but nothing is yet being done. Speaking of the Sanitary Act, the registrar gives his opinion 'it is a piece of cumbersome machinery, very difficult to keep in gear, owing to the conflicting views and interests of the local boards who have the administration of it.' In Cork, No. 7 district, typhus of a malignant type prevailed during the last quarter. Some of the cases were traceable to a 'wake' held over a man who died in the South Infirmary of typhus fever.

At Bruree, Kilmallock district, fourteen cases of typhoid fever occurred in the quarter. The registrar attributes these cases to the dry weather, and to the filthy state in which the labouring class keep their persons and cabins; they scarcely ever wash their children.

At Broadford, Newcastle district, typhus has been prevalent, the people refusing in the dirtiest cabins to have fever cases removed to the hospital. The district registrar considers that the dispensary medical officer should have compulsory power to order their removal, and thus check the progress of contagion. He is quite right in his opinion, for at Killarney, in nearly every instance, patients were willing to be removed to hospital, with the exception of those residing in the townland of Lahard, where, in consequence of their refusal, fever spread to nearly every house in the locality (in all about twenty-seven cases). Most of these houses were unfit for habitation.

At Newcastle, too, in which the union workhouse is situated, the sewage flows into the river, a great part of the bottom of which is exposed to the rays of the sun, giving up bad smells. The well at Castlemahon, from which the people of the village get drinking water, is constantly flooded by the river, and there is also an offensive sewer in the village flowing into the river.

In the historic Skibbereen of the famine period, we are glad to hear that at present the sanitary arrangements are all that could be desired; and also in the equally historic Skull. In the latter place, however, the houses of many of the poor are in a wretched state from the total absence of sufficient sanitary requisites. In the union of this town there is at present a woman hale and hearty in her 102nd year. At Brosna, Tralee district, another woman is reported to have attained the same great age. The sanitary arrangements here are reported to be improving.

In Tralee, No. 1 district, the sanitary authority have at last decided on supplying the town with water. They propose bringing it from a mountain lake three miles distant. If this work be carried out, a population of 9,506 inhabitants will no longer be dependent for their water-supply on a few pumps, always yielding a very impure supply of water.

From the above summary it will be seen how sanitary matters stand throughout Ireland. In several towns and places which we have not mentioned, we are glad to see a marked improvement has taken place of late. We cited a number of bad cases, but not all or nearly all, to show the impediments and drawbacks that still exist to a general sanitary reform throughout Ireland.

THE Medical Officer of Health (Dr. Fraser) for the combined sanitary districts, of which Nantwich, Northwich, Altrincham, Winsford, Middlewich, etc., form part, has been unanimously elected by the curators of the University of Edinburgh successor to Sir Robert Christison, in the chair of materia medica at that University. Dr. Fraser's appointment will cause a vacancy in the office of medical officer of health for the combined district, the salary of which is 800*l.* per annum.

THE
SANITARY RECORD.
FRIDAY, JULY 13, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

WHISKY POISONING.

A RECENT anonymous writer in a contemporary makes the rather startling statement under the heading 'Crime in Ireland,' that doctored whisky sold to the people by itinerant vendors at the numerous country cattle fairs, of which there are more than a thousand every year, is answerable for half the crime in Ireland. This stuff is so strong that a glass or two taken fasting makes many a man temporarily insane, and it is so worthless that the owners have been seen to pour the residue of their stock away rather than have the trouble of carrying it back, and he hopes that the new Lord Lieutenant will endeavour to 'check the supply of sulphuric acid, fusel-oil, and other poisons which make the countryman's drink grateful because he says it has "a bite in it."' Assertions of such a wholesale character are not generally worth much, and there are many reasons why we think this is no exception. In Ireland, as in England, the regulations with respect to the sale of intoxicating liquors, are very strict, and it is well known that no person can be an itinerant vendor of whisky in the ordinary sense of the term. Every vendor of whisky at a fair must not only possess an excise licence for his fixed place of residence, but must also have a magistrate's certificate and supplementary licence from the excise for every fair which he attends. Under these circumstances and considering how whisky-shops abound in every town and village, it is scarcely credible that persons will attend fairs for the sale of whisky so far from their homes that it is not worth their while to carry back their unsold stock, especially when it is remembered that all whisky, irrespective of quality, has to pay a duty of ten shillings per proof gallon. If the whisky thus thrown away was 'potheen,' and had therefore never contributed anything towards the revenue, the matter would seem more reasonable, but with the large number of constabulary and excise officers in Ireland it is scarcely possible to suppose that 'potheen' can be so extensively manufactured as to be answerable for half the crime in Ireland. On the contrary the returns show an increasing revenue from spirits, and consequently a growing consumption of duty-paid whisky in Ireland, and we cannot but think that that sold at fairs, however low its quality, is worth far too much to be thrown away.

With reference to the presence of sulphuric acid in spirits, only one instance (and this did not occur in Ireland) has come under our notice since the Sale of Food and Drugs Act came into operation, and we have reason to believe that the article was so unpalatable as to be quite unmarketable. As to the addition of fusel oil to whisky, the idea is too absurd for consideration, for it is well known that one of the principal difficulties of the distiller is the getting rid of the superabundance which is naturally present in crude whisky. To compel him to remove the fusel oil entirely and produce what is known as 'silent spirit,' would ruin his trade, as such spirit, however long kept, would never acquire the much-valued aroma of matured whisky. In fact, it is obvious that it is to the interest of the distiller to produce as clean a spirit as possible, and to leave only such amount of fusel oil present as is necessary for the production of the desired aroma.

As we have before stated, we believe the deleterious effects produced on consumers of Irish whisky arise from its being consumed in a new and unmatured state; and before the fusel oil, left in for the production of the required aroma, has become changed into the comparatively innocuous flavouring ethers. If it were possible to ensure all whisky being kept in bond for twelve months or more, we should hear less about its adulteration, but of course its cost would be materially increased.

If adulteration of whisky in Ireland prevails to anything like the extent which the writer would have us believe, we think it may be regarded as a somewhat remarkable fact that, although analysts, under the Sale of Food and Drugs Act have for some time been appointed for most of the counties and large towns of Ireland, so few, if any, prosecutions for adulterated whisky have taken place. We must deprecate the writing of such letters as tending to spread unnecessary alarm, and the writer would be far more likely to confer a benefit on the public if he would obtain a few properly authenticated cases of the sale of adulterated whisky, and bring them under the notice of the inspector or analyst of the district.

THE BATTERSEA CEMETERY INQUIRY.

AN inquiry was held by Mr. Holland, of the Home Office, at the Town Hall of the Wandsworth District Board of Works, on June 18, at the instance of the Rev. C. Butler and others, who complained that there had been above 14,900 interments in the eight acres of which this cemetery consisted during the last sixteen years, that the ground used for common interments was full, and the other nearly so, and that injury to health had resulted from the present state of things, as the cemetery was situated on the 'rise' and the drainage consequently found its way to the

lower level. The evidence given was as usual very conflicting, the witnesses on behalf of the Burial Board stating that there is room in the common ground for interments between the spaces without disturbing any of the old graves, whilst those in favour of closing the cemetery said that the graves were so close together that it was almost impossible to distinguish one from another. The medical officer of health, Dr. Oakman, was called, who said that since the previous inquiry the rules laid down for the guidance of the Burial Board had been strictly carried out, and that he was not aware of any case of illness or of nuisance arising from the cemetery. He thought that if people came to live at the bottom of a hill where there was a cemetery at the top they must run the risk of the drainage finding its way to the bottom. To prevent that it would be best to have an intercepting sewer. Dr. Colborne, who lives at the foot of the hill, said that his house was never sweet, and that he had a large number of 'throat cases' of a low type in the neighbourhood. Dr. Jacob supported Dr. Colborne, stating that in his opinion children were sickly, adults had headaches, and there was a peculiar effluvium perceptible. The latter statement was denied by several persons, including the medical officer of health. One person, probably the manager, admitted that his predecessor had buried the poor in 'omnibus graves,' in which twenty to thirty persons had been buried, but that was not done now; also that the common ground had been buried over once. One witness made the following remark: 'Assuming that there was a leakage from the cemetery, could the Burial Board be held responsible, especially when people voluntarily came and lived close to the cemetery?' He also objected to the closing of the cemetery, as there are two acres untouched. In summing up, Mr. Holland said that he did not think the ground could be used much longer, but as the regulations ordered at the last inquiry had been carried out, he could not recommend any interference with the cemetery at present. We may also mention that in a report presented to the Burial Board by the clerk, it was stated that there are about 1,550 burials a year at present; that there was space in the common ground for 145 graves only, in each of which four adults or five children would be placed, so that as most of the burials take place in the common ground, 563 bodies having been buried in that part in six months, it is difficult to understand how this can suffice for two or three years longer, unless the spaces between the 'omnibus' and other graves be used. As we have not seen a copy of the regulations issued respecting this cemetery, we cannot say if this would be legal, but it certainly seems most objectionable to disturb ground close to that in which so large a number of bodies have been buried, especially considering that the cemetery has only been open for sixteen years, and sufficient time has not elapsed for complete decomposition of the dead.

The extent to which properly-drained cemeteries that are under the new regulations affect the health of adjacent residents is a matter of doubt, as the evidence usually given at these inquiries differs to a rather considerable extent; but there can be but little doubt that the emanations and drainage of a cemetery situated and conducted as this is, are likely to act injuriously on the residents of the neighbourhood by producing a tendency to sore throats of a low form, and other cognate diseases. The dictum of one of the witnesses that people who voluntarily come and live near a cemetery are not to be protected by proper drainage and avoidance of overcrowding is utterly unworthy of deliberate discussion. If he be a member of the District Board of Works, it is to be hoped that he does not advocate similar doctrines as regards other sanitary measures; but we are more than astonished that the medical officer of health should be reported to have said almost the same thing. The statement about the 'omnibus graves' is one which we should have thought impossible now, did we not remember that comparatively few restrictions are placed on the cemeteries formed about the time of that at Battersea. We have heard somewhat similar statements respecting some other suburban cemeteries, and feel assured that a general inquiry as to the manner in which all those not under recent regulations are conducted would be beneficial to the public health. In saying this we must not be considered to express ourselves adverse to cemeteries being placed in suburban districts, where they are subject to the following restrictions: viz., that there shall be only one body buried in each ordinary grave, and that it be covered with at least four feet of earth to the level of the adjoining ground. But we consider that the burial of several bodies in one grave should only be allowed subject to the restrictions ordinarily in operation in partly-closed graveyards—that is to say, by enclosing each coffin in concrete, not disturbing the earth afterwards within one foot of the concrete, and allowing four feet of earth above the upper coffin. Where these regulations are carried out, we have not heard of any complaint, except objections arising out of the tolling of the bell, and the presence of the mourners and funereal paraphernalia.

Notes of the Week.

PRINCE MILAN has conferred the Gold Cross of the Takovo Order upon Mr. William Collingridge, in acknowledgment of services rendered during the Turco-Servian war. Mr. Collingridge was the first English surgeon upon the Servian field.

A MEETING has been held at Nantwich to collect subscriptions for a testimonial to Mr. James Pick, clerk and assistant to the Board of Guardians, who has retired from the office after holding it for forty years. About 21*l.* was promised at the preliminary meeting of the committee appointed by the Board of Guardians to make arrangements for the contemplated testimonial.

IT was resolved after the recovery of His Royal Highness the Prince of Wales from his severe illness to raise a memorial in the Eastern Counties of thankfulness for such recovery in the shape of a convalescent home at Hunstanton. Hitherto the purposes of the home have been carried on in a row of cottages, and 500 or 600 invalids, mostly from Norfolk and Cambridgeshire, have been cured. A contract has now been signed and a commencement made of a new and suitable building on a freehold site at Hunstanton, St. Edmunds.

THE MANCHESTER WATER-SUPPLY.

THE Waterworks Committee of the Manchester Corporation have laid before the council a scheme for the purchase of Thirlmere, one of the Cumberland lakes, and the conveyance of water from it to the city by an aqueduct 100 miles long. The works will occupy seven years in execution, and the cost for the first instalment of water will be 1,100,000*l.*, for which works will be constructed for impounding fifty million gallons of water per day. The water is stated to be even superior to that of Loch Katrine. The lake is to be raised to a level that will give it an area of 700 acres, and the reservoir will contain 800,000,000 cubic feet. It is proposed to purchase draining ground of about 11,000 acres, and the committee were advised that the water could be supplied by gravitation. The council gave power to the committee to carry out the scheme.

PLAYGROUNDS FOR CHILDREN.

AT an inquest held by Dr. Hardwicke on the body of Alfred Raymond Peters, of Leigh Street, Burton Crescent, a boy five years old, who was run over by a cab in Theobald's Row, Holborn, and died directly from internal injuries produced, the father said there were no playgrounds for children in the neighbourhood where he lived, and they were compelled to play in the street. The coroner said this was one of a very large class of accidents traceable to the want of playgrounds for children. The throwing open of the playgrounds belonging to board schools in the evenings and on Saturdays as general recreation grounds would be a great boon. If some of the squares could also be similarly thrown open it would prove advantageous. Red Lion Square, which was now a place of business, might safely be thrown open in the evenings for recreative purposes for children.

ASHES AS DEODORANTS AND DISINFECTANTS.

AN old report (1875) by Dr. Page, medical officer of health for Kendal, contains some important statements as to the use of ashes in privies and closets, and strongly corroborates the opinions advanced by Dr. Syson at the late sewage conference. Dr. Page says, 'It ought to be understood that coal ashes are destitute of the deodorising properties of soil, and that the so-called ash-closet is disclaimed by the advocates of the other, possessing none of its merits, being in practice very frequently worse in some ways than the common privy, and, generally speaking, a failure in a hygienic point of view.'

On house-drainage also Dr. Page makes some interesting remarks, and gives drawings in illustration. The idea or necessity of an inlet does not seem to have occurred to Dr. Page, for he advises mere prolongation above the eaves of the house as sufficient to ensure ventilation. To our minds it seems that this plan secures relief from pressure, but hardly ventilation in its true and strict sense.

THE VALUE OF SMALL-POX HOSPITALS.

THE utility of these institutions is well illustrated in the report of Dr. Iliffe, the Medical Officer of Health for the borough of Derby. It appears that a clerk employed by the Midland Railway Company, during the Christmas holidays, visited some friends at Manchester, where the disease was prevalent. No doubt he contracted it there, but it did not develop itself until his return to Derby. He was at once conveyed to the Small-pox Hospital, where he died. The poor fellow was in lodgings where several other clerks also lived, and where also about twenty others dropped in daily to dine. It was, therefore, very necessary that the patient should be removed from such a place at the earliest possible moment, and while the disease was in a comparatively non-contagious stage. This being done, and the case isolated, re-vaccination performed on the remaining inmates of the house, fumigation adopted, and fresh air admitted, no other case was heard of. This is the second time within six months that the Derby Small-pox Hospital has been of equal utility in stopping the spread of the disease.

BURIAL GROUNDS.

A PARLIAMENTARY volume, extending to 467 folio pages, obtained by Mr. Osborne Morgan, M.P., showing the number of burial places, with the population, in each county in England and Wales, has been issued. The grand total of the population is stated at 22,712,266; the number of consecrated places of worship is 15,468; the total number of churchyards as burial places, 13,673, of which 12,262 are open and 1,411 closed; the number of consecrated burial grounds provided under the Church Building Act as enlargement of such churchyards, 1,169, of which 1,146 are open and 23 closed; the number of burial grounds separated from such churchyards 393, of which 328 are open and 65 closed; the number of unconsecrated places of worship, 20,490; the unconsecrated burial grounds attached to such unconsecrated places, 5,074, of which 4,111 are open and 963 closed. There are 657 other burial grounds, and 282 consecrated. Besides this number there are 273 other consecrated burial grounds not in the description, of which 255 are open and the rest closed. In Middlesex the population is returned as 2,539,765, the number of consecrated places of worship 509, and 233 churchyards. There are 611 unconsecrated places of worship.

THE SCHOOL-BOARD PLAYGROUNDS.

THE subject of opening the playgrounds of the Board Schools on Sundays after three o'clock gave rise to a long discussion at the last meeting of the School Board. The proposition was made by Mr. S. Buxton, seconded by Mrs. Westlake, who made an earnest appeal to the Board to save the children from the gutters and from roaming the streets, and protested against a proposed 'miserable device' of letting persons in to preach to the poor children in the playgrounds, as was to be proposed by Mrs. Surr. On her part, Mrs. Surr vigorously contended for the sanctity of the Sabbath, and protested against playing being permitted on the Sunday. To this Mr. Picton answered at length, and urged that, as the drink shops were open on Sunday and the playground closed, the picture persented to the child's mind was that drunkenness was 'keeping the Sabbath' holy, while innocent play was not. The Rev. E. Daniell also supported Mrs. Westlake's views, and said that the manner in which children were kept at services and Sunday-schools was sufficient to give them an unconquerable antipathy to religious services. Nature was not suspended on the Sunday, and if it was right to cure disease on the Sunday, as the Saviour did, it was right to prevent it by giving children healthful play. No conclusion was arrived at, the debate being adjourned.

THE LOWER THAMES VALLEY DRAINAGE SCHEME.

AFTER four days' hearing before the Select Committee of the House of Lords, the provisional order of the Local

Government Board providing for the carrying out of a sewerage scheme for the districts around Kingston and Richmond has been advanced one step. The local board of Hampton Wick, by its chairman, Mr. T. J. Nelson, the City solicitor, promoted the scheme, which was opposed by the Twickenham Local Board and landowners in that parish, the Thames Conservancy Board, and the Corporation of Kingston. Several eminent engineers were examined, and arguments were heard against other provisions than those of an engineering character, and in the result the district of Twickenham was struck out of the schedule on account of the works now in operation for the drainage there. Clauses for the protection of the Thames were inserted, and the penalties incurred for non-compliance with the Thames Conservancy Board's requirements are suspended for three years, and then to fall on the joint board instead of on individual authorities. The mode of raising the needful funds was also changed. Instead of districts contributing according to the number of houses in their respective areas, they will have to pay on their assessable value. This alteration will excite a new and strong opposition, as it will affect rural districts in which houses are few but acres many. The order will be pushed forward, the *Pall Mall Gazette* is informed, with all speed, so as to obtain legislation upon the subject this session.

ROYAL HOSPITAL FOR DISEASES OF THE CHEST.

THIS hospital has just been re-opened. Considerable alterations have been made; there are now twenty-six beds, the number before enlargement being twelve. The out-patients' department is entirely new, and comprises large, lofty, and convenient waiting, consulting-rooms, dispensary, etc. There are two wards for women on the ground floor, communicating by arched openings, each ward containing six beds; on the first floor is a counterpart arrangement for men, also a small ward for two beds. The upper portions of the walls are finished with the Liverpool Silicate Paint Company's washable distemper; the lower parts with a dado of enamel paint, giving the wards a clean and cheerful appearance. The cubic space per patient is about 900 feet. The warming is effected partly by hot water coils, and partly by open fire-places. We have not much to say in favour of the general sanitary arrangements; vertical ventilators are placed in the wards, without any means of regulating them according to the pressure of the wind, and the same area of inlet only is provided for six beds as for two. The dormitories for the nurses have sloping ceilings, are small and ill-ventilated, the cubic space being about 500 feet per bed. Old and inferior pan-closets are provided for the in-patients, the sinks are fitted with the objectionable movable bell traps, as is also the floor of the mortuary and post-mortem room. The drainage appears to have been the last instead of the first consideration. We were shown an attractive view of the exterior of the building, but there was no plan of nor did any one know anything about the drains. We were told, however, that the Board of Works were going to see to the matter, and we left their man, on the opening day, looking for them.

THE SINEWS OF WAR.

AT a meeting of the Birmingham Town Council on Tuesday, presided over by Alderman Chamberlain, M.P., in the absence of the Mayor, a statement was made by the chairman as to the scheme for raising the funds requisite for the carrying out of the Borough Improvement Act, so that the principal should be repaid in sixty years, and the rate of interest should not exceed his original estimate of 3½ per cent. That rate he had been led to adopt as the basis of his calculation for the terms of the Artisans' Dwellings Act. But when the Council applied to the Public Works Loan Commissioners for the required advance at that rate, subject to repayment within fifty years, the commissioners said that under a minute which they had received from the Treasury they were prohibited from lending at the low rate of 3½ per cent. for other than short terms, and if they lent to Birmingham for fifty years they must ask for another ½ per cent., which would make a difference of 10,000*l.* a year, equivalent to a second rate, and it was absolutely impossible in such circumstances that they should carry out the scheme. They then attempted to raise the money by a loan on the London market, but were unsuccessful. He went, at the request of the Improvement Committee, to the Chancellor of the Exchequer, as the head of the Treasury, and pointed out to him the position in which they were placed. They thought they had as much right to money at 3½ per cent. for fifty years as the Birmingham School Board and other School Boards. The Chancellor of the Exchequer pointed out that the Education Act made it compulsory to advance money at 3½ per cent., whereas under this Act it was optional. If the application from Birmingham was entertained, it would lead to an immense number of applications from all parts of the country, which it would be invidious to refuse. Mr. Chamberlain then proposed the alternative sketched in the report of the Improvement Scheme Committee—viz., that the Corporation should borrow from the Public Works Loans Commissioners, for the purposes of the Artisans' Dwellings Act, such sums of money as they may require, to be repayable within thirty years, with interest at the rate of 3½ per cent., power being reserved to the Council to re-borrow from time to time, and from local sources, the difference between the amount required for the repayment within thirty years and the sum which would be necessary to recoup the whole loan in the term of sixty years, which had been sanctioned by the Local Government Board. To that scheme the Treasury had promised to offer no opposition. Mr. Chamberlain did not doubt for a moment they should be able to borrow these small sums of 40,000*l.* per annum at 3½ per cent., and the result would be, at the end of thirty years, that they would have paid off the Commissioners, and would owe to the general public the balance of the loan which ought to remain unpaid. Calculated upon a sinking fund for sixty years, the position of Birmingham sixty years hence would be that they would be the owners of ninety-three acres of freehold land, of a value which he was not prepared to estimate, but it would be worth millions sterling, and the whole of it would be at that time repaid. The scheme was unanimously approved. In moving subsequently the adoption of the Gas Committee's report, which proposed to sell to the London and North-Western Company a piece of land belonging to the Corporation for the purpose of a siding, Mr. Chamberlain said that in addition to the profit of 6,000*l.* made on the re-sale of the land, the introduction of a railway into the works would be a saving of 2,000*l.* or 3,000*l.* a year, which, if capitalised, was equal to a saving of 50,000*l.* to the town.

Special Reports.

THE SANITARY INSTITUTE.

DR. RICHARDSON gave a lecture on the 5th inst. to the members of the Sanitary Institute of Great Britain, in the Theatre of the Royal Institution, on the Political, Medical, and Social Aspects of Future Sanitary Science. The lecturer, in the first part of his lecture, said that by comparison with all the other nations of the world we had obtained legislative measures which were splendidly comprehensive. No other country in the world could present an approach to the Public Health Act of 1875. That Act, as far as it went, was admirably constructed. Its constitution of sanitary authorities throughout the kingdom; the power it vested in those authorities to appoint learned medical officers of health; the provisions it made for securing to each locality better sewerage, freedom from

nuisances, improved water-supply, regulation of cellar dwellings, governance over offensive trades, and removal of unsound foods; the provisions for prevention of spread of infection and for the erection of hospitals and mortuaries; and the provisions for the regulation of streets and highways, lighting of streets, establishment of pleasure grounds, and regulation of slaughter-houses—these, as well as the general provisions for the carrying out of the Act, were most commendable as practical plans by the working of which the nation may be tempered into a sanitary mould of thought and character. In a word, the Act of 1875 was an improvement of the first degree on all that has preceded it, and although much of it, by the necessities of the constitution of our country—which recognised the domination of free will even in its age of ignorance—was of a permissive nature, the working of the Act must in a few years remove a great amount of disease from the land and prevent the invasion of diseases of an epidemic and spreading type. Dr. Richardson urged the necessity for a health department of the State exclusively devoted to the health of the people, and another point he pressed was the necessity of having a digest of all practical sanitary laws, so prepared that any person of intelligence could understand them. Then, in the future of sanitary science, the politician must come forward more resolutely than he had yet done, in order to secure for those he governs three requisites—pure water, pure food, pure air. It was utterly hopeless to trust to companies in a matter of such vital moment as the supply of water. It was equally hopeless to trust to the undirected action of local authorities. If we trusted to such agencies for the collection and delivery of letters by post, did anyone suppose that the results of our present postage system would be attained? Yet, important as intercommunication by letter is, it was less important than the supply in due quantity and pure quality of that vital fluid which makes up three parts out of four of every human organism, and which was wanted as much by the millions who never receive a letter, as by the millions who do. In this political part of 'sanitation,' the Government must do one of two things. It must either produce a process or processes for pure water-supply, and insist on every local authority carrying out the proper method; or it must—and this would be far better—take the whole matter into its own hands, so that under its supreme direction every living centre should, without fail, receive the first necessity of healthy life in the condition fitted for the necessities of all who live. By recent legislation we had some security for obtaining fresh animal food, and foods freed of foreign substances or adulterations. The penalties that might be inflicted on those who sell decomposing, diseased, or adulterated foods were beginning to have effect, and much good was resulting. Nevertheless, even here the legal rule fell short of completeness. The inspection of animal food was as yet most unsystematic and imperfect. With all our richness of means ready at command, we had not approached that admirable system for the inspection of animal foods which our Jewish brethren, through ages of ignorance and oppression, had managed so efficiently to carry out, and which had entirely saved them from many of the great calamities of disease that had fallen on less careful people. The complete inspection of animal foods, including milk, was a clear piece of sanitary law which, from day to day and hour to hour must ultimately be enforced. As to pure air, there was no practical legislation of any kind. The air of our large towns was charged with smoke and impurity. The air of our great factories was charged with dusts which destroy life with the precision of a deadly aim. Dr. Purdon, one of the certifying surgeons under the Factory Acts, reports that in flax-working factories under his care the carders, who are all females, if they get a carding machine at sixteen years, generally die at thirty years. Could any fact be more terrible than such a fact, that a girl of sixteen should have to live by an occupation that will bring her existence to an end in fourteen years, and to that end with all the prolonged wasting, sleeplessness, suffering, incident to the disease consumption of the lungs? If it were the fate of these doomed workers that at the close of fourteen years' work the majority of them were taken forth and shot dead in an instant, their fate were infinitely better than it is. The heart of the nation would thus be aroused, and the law in all its majesty would be put in operation to arrest the progress of the crime and to punish the offenders. Yet, year after year as terrible an offence goes on, and because the result of it is hidden in the sick-room there is no arrest of its progress, no punishment for its commission. He pressed this subject at considerable length, and passing on to the medical part of the question, greatly praised the medical profession for the part they had taken in urging, against their own interests, that prevention must take the place of cure. As to the social part this he said was to be carried out only by educational action, and in the concluding part of his address he said, 'I have been brought indeed by experience to the conclusion that the whole future progress of the sanitary movement rests for permanent and executive support on the women of the country. When as a physician I enter a house where there is a contagious disease, I am, of course, primarily impressed by the type of the disease and the age, strength, and condition of the sick person. From the observations made on these points I form a judgment of the possible course and termination of the disease, and at one time I should have thought such observations sufficient. Now I know them to be but partly sufficient. A glance at the appointments, and arrangements, and managements of the house is now necessary to make perfect the judgment. By this is shown what aid the physician may expect in keeping the sick in a condition most favourable for escape from death; and by this is also shown what are the chances that the affection will be confined to one sufferer or distributed among many. As a rule, to which there are the rarest exceptions, the character of the judgment hereupon is dependent on the character of the presiding genius of the home—on the woman who rules over that domain. The men of the house come and go; know little of the ins and outs of anything domestic; are guided by what they are told, and are practically of no assistance whatever. The women are conversant with every nook of the dwelling, from basement to roof, and on their knowledge, wisdom, patience, and skill, the physician rests his hopes. How important, then, how vital that they shall learn as a part of the earliest duties, the choicest sanitary code; how correct the decision of the founders of the Sanitary Institute, that from the first they should include sanitarians of both sexes as working associates.'

On the motion of Dr. Bartlett, seconded by Mr. Brudenell Carter, a vote of thanks was given to the lecturer. The new foreign associates—Dr. Marié-Davy, Dr. Pietra Santa, and several members of the *Société Française d'Hygiène*—were then presented and welcomed, and a vote of thanks to the Council of the Royal Institution terminated the meeting.

METROPOLITAN DRINKING FOUNTAINS ASSOCIATION.

THE Metropolitan Drinking Fountains Association held its annual meeting on the 30th ult., the Duke of Westminster in the chair. The report, read by Mr. John Lee, the secretary, stated that thirty-three drinking-fountains for human beings and fifty-eight troughs for animals had been erected during the last twelve months, making a total number in London at the present time of three hundred and twenty-four drinking-fountains and three hundred and forty-two troughs. In accomplishing this they had expended all the funds at their disposal, and had also rendered an annual increase of income necessary for the permanent supply, supervision, and repair of the metropolitan fountains and troughs. Notwithstanding the extraordinary progress made, there were still hundreds of miles of streets in London where neither man nor beast had the remotest chance of obtaining a drop of water to quench thirst. The

operations of the society extended over a district covering more than eight hundred square miles. After referring to the earnest support that the association received from the various vestries and district boards of the metropolis, and to the fact that the Queen was a donor of 100*l.*, the report stated that the donations during the year amounted to 1,769*l.*, the subscriptions to 1,528*l.*, and legacies to 2,000*l.* The Hon. A. Kinnaird, in seconding the adoption of the report, suggested that an attempt should be made to get 1,000 subscriptions of 5*l.* and 500 of 10*l.*, so as to raise a sum of 10,000*l.* within the next five or six months, and at once largely extend the area of the work of the society.

WINDOW GARDENING.

THE annual distribution of prizes to the successful competitors in the late exhibition of the Notting Hill Workmen's Flower Show and Home Encouragement Society took place on July 3 in Lansdowne Gardens, Ladbroke Grove, Notting Hill. The prizes were distributed by the Lady Edith Ashley, who was accompanied by the Earl of Shaftesbury, one of the vice-presidents. The money prizes varied from 1*s.* 6*d.* to 1*l.*, and the miscellaneous prizes included pictures, watering-pots, and flower-stands. The recipients were of all ages, not the least observable being an old soldier. Periodical visits are made to the houses of the members of the society, and it is stated that great improvements have been made therein since the society has been established.—The annual flower show in connection with the Society for Promoting Window Gardening amongst the Working Classes in the united parishes of St. Margaret and St. John, Westminster, took place on July 3, by permission of Dean Stanley, in the College Green, Great College Street; and in the evening the prizes to the successful exhibitors were distributed by the Earl of Shaftesbury. After the distribution the noble earl said he was confident that among the subordinate features of education there was not one which tended more to refinement, to elevate the taste, and to reduce the coarseness and brutality of many of the poorer classes than the study and culture of flowers. He should be glad to see these exhibitions extended all over the metropolis, and he trusted that patrons and patronesses would come forward to support them so long as there were children to be born and flowers to be cultivated. On the motion of Dean Stanley a vote of thanks to Lord Shaftesbury was passed.

Medical Officers' Reports.

CALCUTTA.

THE reports of the health officer for Calcutta, Dr. Arthur J. Payne, reveal a state of things so disgusting and so frightful that the immediate interference of the Imperial Government is peremptorily demanded. The fate which Sennacherib tauntingly foretold the besieged Jews at Jerusalem is the normal condition of a large section of the inhabitants of Calcutta. 'The people live on soil saturated with, and largely composed of, excrement; they drink excrement in the water and bathe in liquid sewage, and the air they breathe is thick with poisonous exhalations.' It must be borne in mind also that when a native bathes, his mouth is repeatedly filled with the stuff he washes in, however foul it be, and it is used also for his clothes and his cooking vessels.

'Midway between urine and effluent sewage,' 'Strong sewage,' 'Stronger than London sewage,' are the words the analyst has to use respecting the tank waters sent to him for analysis. We agree with the health officers that 'no word-painting could deepen the shadows of a picture which presents itself in Nundiram Sen's Street to the eyes of everyone who cares to see it.' 'A filthy drain, passing between the high masonry walls of houses, receives the contents of their privies, which are freely discharged into it through the apertures in the walls. To the foot of the walls, whitening the margin of the black mass of filth which falls into the drain, there cling myriads of maggots. They are heaped along the line, and fall in matted clusters, into a slender fluid stream which courses slowly down the surface of the fetid mass, and with it they are drifted along to a hollow, close at hand, known in the local parlance as a 'tank.' The liquid which fills the hollow owns no source of supply but this foul stream, and such casual additions as rare showers of rain may make which fall in its area. The banks are composed of house filth and refuse of every kind; and a few yards from the entrance of the drain there is the 'bathing ghat' where daily a human crowd resorts to share with the maggots their sewage bath, and to rinse their mouths and cooking pots in concentrated filth. And the margins of this pool and the adjoining land are covered with huts, so closely set together that single-filed passage can hardly be had between them.' It will hardly be believed that the local authorities' reply to this state of things is practically this—'This is private property, we cannot touch it—we can do nothing except by prosecution, and that is, for all purposes of improvement, practically useless; nominal fines only are inflicted, and they defiantly tell us it costs less to pay repeated penalties than to clear away the filth.' From these extracts it will readily be conceived that Calcutta is one of cholera's strongholds, and Dr. Payne says that 'after some years' marked improvement it is now becoming yearly more productive.'

The authorities, on Dr. Payne's recommendation, have ordered that a selection should be made of twelve 'bustees,' and that a report should be made, and plans and statistical information prepared; but this seems a tame policy in face of the evils enumerated in the reports. It is admitted that the pure water now partially supplied has influenced directly the cholera rate for good, but this water is not supplied in sufficient quantity to be of general service, nor is it introduced into the interior of the 'bustees,' and it is curious to note that as the constancy and quantity of the water-supply decreased the cholera deaths have increased, while the decrease on its first introduction was so marked that the law of seasonal influence was itself affected.

This year there have been 1,267 deaths in Calcutta from cholera, and the deaths exceeded the births by 3,951. In 1875 there were 1,726 cholera deaths. Out of 1,000 children born, 480 die before they reach one year of age. Indeed, Dr. Payne remarks that a healthy-born child has less chance of living than a cholera patient.

It is impossible to note all the points in these reports, but the whole burden of their plaint, while making every allowance is that the evils are removable if only grappled with a determined and firm hand. One portion must be referred to, as it illustrates a home controversy. Dr. Payne recommends that, for economy's sake, the road sweepings should be utilised for filling up the tanks in the 'bustees,' and expresses an opinion that no ill effects are likely to follow buildings on such made sites.

One thing is certain, that Calcutta must immediately be supplied with water in plentiful quantity (the quality of that supplied at present is said to be excellent), all tanks must immediately be filled up, and a thorough system of conservancy instituted. After carefully weighing one and all the difficulties, our deliberate conclusion is that the difficulties to be encountered are not greater than those met with in our own towns and cities. To reform the domestic habits of the people will, of course, take a long time, but an increased water-supply and a system of conservancy are matters which can be carried out almost simultaneously with the determination to do so. What M. Goux has done for some of the barracks and camps of our French neighbours can easily be done for these 'bustees,' and his system seems to be peculiarly applicable to the native portions of Calcutta. As for water, that is only a question of pipes and supply. In conclusion, so restricted is the water-supply at Calcutta that the justices have forbidden the shipping to use the filtered water, and have so condemned the merchant fleet to almost certain

cholera, and also have thus taken the most sure means to spread this dread disease to other countries. Indeed, it seems as though the Calcutta authorities were determined, to adopt the words of the reports, that their city shall be foremost of those held up to the denunciation of the world as a place where, with full knowledge of having dispensed calamities in the past and with foresight of further calamities, which, as like results of like causes unremoved, must surely find here a starting-point, the people and authorities have been content to maintain a breeding-place for mortal disease and have complacently sanctioned its dissemination into Europe!

Parliamentary Proceedings.

HOUSE OF LORDS.

(Friday, July 6.)

IMBECILE, LUNATIC, ETC. (IRELAND) BILL.

LORD O'HAGAN moved the second reading of the Imbecile, Lunatic, and other Afflicted Classes (Ireland) Bill, and explained that the object of the measure was to amend the laws providing for the care of those classes in Ireland. Lord Oranmore and Browne opposed the second reading, because he did not believe that sufficient precaution was taken under the Bill for proper and careful inspection. The Duke of Richmond and Gordon admitted that the condition of the unfortunate classes to which the Bill referred deserved every consideration, but he thought that it would be better not to proceed further with the Bill during the present session, as the Government contemplated the issue of a Commission of Inquiry into the whole question, with the view to ascertain what provision could be made for the unfortunate classes for whose sake the Bill had been introduced.

The Bill was then withdrawn.

HOUSE OF COMMONS.

(Tuesday, July 3.)

VACCINATION.

EARL PERCY moved that it is expedient that an inquiry should be instituted into the practice of vaccination, for the purpose of ascertaining whether it cannot be conducted in a more satisfactory manner than it is at present. He urged that the desirability of adopting the practice of vaccination from the calf was well worth the attention of the Government and the House. Mr. Pease proposed that the House should amend the motion by adding to it the words "and whether the law relating to the accumulation or repetition of penalties for the same offence does not require amendment." Sir T. Lawrence hoped that the right hon. gentleman, the President of the Local Government Board, would be in favour of putting facilities in the way of the public for introducing direct animal vaccination.

Mr. Sclater-Booth defended the present system of vaccination as effectual, and with respect to repeated prosecutions for non-compliance with the law, said that while he was not in favour of such prosecutions on general grounds, he thought a discretion must be left to the prosecuting authorities and to the magistrates.

Mr. W. E. Forster trusted that the noble lord would be content with the manner in which his motion had been met by the right hon. gentleman, and not press it to a division. For the House to decide that there should be an inquiry would be to tell their constituents that they had great doubt whether the practice of vaccination was satisfactorily conducted, and that, he held, would be a most dangerous step to take in the face of the present epidemic. In his opinion what was needed was to go back to what was the law in England up to a few years ago, and what was practically the law now in Scotland and Ireland, and be content with such a penalty as would make all persons who had not a strong conscientious feeling against vaccination have their children vaccinated and let the others alone. He should be glad if the President of the Board of Trade would take a suitable opportunity of proposing to amend the law in the direction he had indicated.

Mr. Walter suggested that the American plan might be adopted of preventing the admission of unvaccinated children to elementary schools.

Earl Percy having expressed the intention of accepting the amendment, and dividing the House on the whole question, The motion was amended accordingly, and the House divided—

For the motion as amended 56
Against ..... 106—50

The motion was therefore rejected.

(Thursday, July 5.)

THE PUBLIC HEALTH (METROPOLIS) BILL.

REPLYING to Mr. J. Holms,

Mr. Sclater-Booth said,—I may inform the hon. member that I have already given directions for a memorandum to be prepared showing the clauses which are taken from the Acts now in force in the metropolis, whether with or without alteration, those which are from Acts not so in force, and those which are new. Much of this information is already given in the marginal notes of the Bill. But when he asks me to state what power now vested in the Secretary of State or Privy Council is proposed to be transferred to myself, I must reply that the Bill does not propose to transfer any such power, because all the powers of the Secretary of State and of the Privy Council under the Acts consolidated by the Bill were so transferred by the Local Government Board Act, 1871. I am surprised that there should be any misunderstanding on this point, because it was only in January last that, in the exercise of the powers so transferred, I caused a circular letter to be addressed to the Vestries and District Boards of the metropolis on the subject of providing hospital accommodation under one of the Acts now proposed to be consolidated, and no exception was taken by them in reply to the authority under which I so addressed them. There is substantially no modification of the powers now vested in the local authorities. On the contrary, some fresh powers are given to them by the Bill. The only new powers proposed to be conferred on the Local Government Board are with respect to the provision of mortuaries and the approval of voluntary arrangements between two or more authorities for providing joint hospital accommodation.

Law Reports.

POLLUTION OF STREAM BY SEWAGE.

THE Duke of Sutherland, under an order granted by the Court of Chancery some months ago, has issued a writ for the sequestration of the rates of the borough of Newcastle-under-Lyne. The object of the order is to restrain the Corporation from turning sewage into a tributary of the Trent, which river runs past Trentham Hall.

A MILK 'MISTAKE.'

F. BAKER, milk purveyor, of 29, Commercial Road, Pimlico, appeared to a summons under the Food Act, taken out at the instance of the Vestry of St. George, which alleged that he had sold an article of food, to wit, milk, not of the substance, nature, and quality demanded by the purchaser. The solicitor to the Vestry conducted the prosecution. It appeared from the evidence that a pint of milk was purchased by the nuisance inspector for 2½*d.*, the price of the best milk, and on analysis by Dr. Corfield was found to contain no less than 30 per cent. of added water. The defence was that the boy who sold it had mistaken the bowl, and had served 'skim milk' instead of the best article. Defendant was fined 10*s.* and 12*s.* costs.

SALE OF VERMIN KILLER.

AT Guisborough Petty Session P. B. Ayton, a chemist at Lingdale, was summoned for having neglected to enter in a certain book, as required by Act of Parliament for the purpose, the sale of a packet of poison. The defendant pleaded that he was in London at the time, and that the mistake was made by his assistant. It was stated that the poison—a packet of Battle's Vermin Killer—was sold to a young woman who, whilst in a low way, swallowed a considerable dose and poisoned herself. The defendant said there was no evidence that the young woman poisoned herself, but Admiral Chaloner remarked that even if that were the case it did not alter the fact that the poison was sold and no entry had been made. It was a serious offence, and the Bench felt it their duty to inflict the full penalty of 5*l.* and costs.

VENTILATION OF TRAMWAY CARS.

MR. DUNCAN, secretary of the Glasgow Tramway Company, was charged at the Central Police-court with having contravened by-law 4 of the by-laws for the regulation of the tramways, in having failed to keep in working order the ventilators of a car. He pleaded not guilty. Inspector Taylor had inspected the car in question, and found that the front and rear ventilators were shut and could not be opened. The day was very sultry, and there were a number of passengers in the car. He had warned the conductor two days before of the bad ventilation. The ventilator had not been opened since the car was re-painted some months before. Mr. Orr, who appeared for the Tramway Company, asked whether the car was not better ventilated than all the omnibuses in Glasgow? The inspector said he did not know. In the course of other evidence it was stated that both ventilators had afterwards been opened with very slight pressure. The charge was found not proven.

THE SOUTH-EASTERN RAILWAY COMPANY.

MR. NAPIER attended from the Metropolitan Board of Works to support a summons obtained against the South-Eastern Railway Company for not securing 50, Ewer Street, near Glasshouse Yard, which was in such a dilapidated condition as to be dangerous to the inmates and the inhabitants of the neighbourhood. The district surveyor said that the house was very old and of wood, except the chimneys, which were in an unsafe condition. The house ought to be pulled down. Mr. Napier reminded his worship that this house was one of a lot acquired by the company to extend their line, and, not being wanted, was allowed to go to ruin. A number of poor people lived in it, and unless immediate steps were taken to secure it their lives were in danger. A clerk from the office of the company said that they had no cause to show against the proceedings, but they were fearful of an action from the freeholder. Mr. Partridge ordered the house to be secured immediately.

NEGLECT TO MAKE A NEW STREET.

THE Queen's Bench Division has had before it a motion—*ex parte Lord Salisbury*. This was an application for a rule *nisi* calling on the Metropolitan Board of Works to show cause why a writ of *mandamus* should not issue commanding them to make a road from Carting Lane to a road styled in the Metropolitan Board of Works (Various Works) Act, 1875, Road No. 1. This Road No. 1 runs parallel with the Victoria Embankment, and the road in question, by the plan forming part of the Act, ought to run from it northward to Carting Lane. By the Act the Board were required to make the road within fifteen months after the passing of the Act, and they had the option, with regard to Road No. 1, to make it a footway or a carriage-way, but this option did not extend to the connecting road. It was stated that the Board had failed to make the connecting road. The Court granted a rule *nisi*.

RIGHTS AS TO DRAINS.

THE Master of the Rolls has had before him the case of Wilberforce *v.* Hearfield—an action brought to compel the defendant to clear out a drain or dyke, about six feet wide, running between the estates of the plaintiff and defendant, near Hull; and the chief dispute between the parties was in which of them the ownership of the drain was vested. A great many witnesses were called for the purpose of assisting the Court to determine this question, which might surely have been disposed of at the Assizes. In the result the Master of the Rolls, after remarking on the trumpery nature of the question in dispute, decided that the plaintiff and defendant were tenants in common of the ditch, and left each party to pay his own costs.

PROPERTY OF SMALL-POX PATIENT.

AT the Wandsworth Police-court Mr. Bridge has heard a summons for detaining chairs and other articles belonging to Esther Drew, whose husband had died in the hospital from small-pox, and ordered them to be delivered up. The defendant, a man named Cable, of Bromell's Buildings, Wandsworth Road, who detained the things for rent, held up a little boy and said he had suffered from small-pox, and that on being discharged from the hospital he was nearly blind, doctors who had seen him stating it was through neglect. He was now attending the Ophthalmic Hospital. Mr. Bridge gave the man 10*s.* for expenses in taking the boy to the hospital, and promised another 10*s.* if the boy went on well.

COMPENSATION FOR THE DEATH OF A BABY.

SHERIFF CLARK, at Glasgow, issued an interlocutor in a case in which J. M'Lean, labourer, sued R. Falconer for 200*l.* The grounds of the action were that the pursuer's son, a child of seventeen months, was attacked by a furious and savage cock belonging to the defender, and which, although known to be of vicious habits, was kept unenclosed and unpenned. In consequence of injuries inflicted by the animal on the child's face and head, it died. The action originally came before Sheriff Lees, who held that as the cock had not been proved vicious the defender was not liable. The matter was appealed, and Sheriff Clark now finds that it had been made out that the cock was of a dangerous character and ferocious disposition, and gives decree for 15*l.* with expenses. His lordship, in a note, considers that there is no question that the child was injured by the cock, and died in consequence.

VACCINATION CASE.

J. ABEL, watchmaker, whose case has lately given rise to several questions in the House of Commons, has appeared at Faringdon, in answer to a summons to show cause why an order should not be made on him to have his child vaccinated. The defendant said his child had not been vaccinated, and so long as he had health and strength his son should not be vaccinated. Mr. Bennett said it did not signify what the defendant's opinion was, the law must be complied with. The defendant said the magistrate had a discretionary power under the 29th section, and the latter part of the 31st section likewise gave a discretion as to the issue of a compulsory order. The justices' clerk said the defendant evidently relied on the words 'if he think fit' as giving a discretionary power to the magistrate. Mr. Bennett said he did not consider he had any discretionary power in the matter. The defendant then mentioned a case of a person near Rugby, in which the magistrate had refused the granting of an order to compel vaccination where the man had been repeatedly fined. Mr. Bennett said he thought no difference should be made in the cases, and he should order the child to be vaccinated within a fortnight. The defendant said that after what had passed in the House of Commons in his case he should refuse to pay, and they might do what they pleased with him. The defendant's brother, however, paid.

FLAGRANT MILK ADULTERATION.

B. JONES, dairyman, 64, Red Cross Street, was summoned for selling milk adulterated to the extent of 53 per cent. of water. The inspector said that the defendant and another dealer supplied persons employed at Welsh and Margetson's, Southwark Bridge Road, and that great complaints were made as to the quality supplied. He went to the factory, and waited until defendant entered with his can, and then he asked a workman to purchase a pennyworth. It was handed to witness in the defendant's presence, and he told him he was going to have it analysed by Dr. Bernays at St. Thomas's Hospital, who pronounced it to be adulterated as above. The defendant said that owing to the market being closed to beasts he was unable to purchase cows, and being short of milk on the day in question he purchased three quarts of a man in the street, and believed it to be all right. Mr. Benson observed that it was a very bad case, and fined defendant 10*l.* and 12*s.* 6*d.* costs.

PAVING EXPENSES.

MR. T. COURTENAY, 474, King's Road, Chelsea, was summoned by the Vestry to show cause why he should not be adjudged to pay the sum of 133*l.* in respect to the paving in front of those two houses, abutting on Shalcomb Street, which had been duly apportioned for him to pay under the Metropolis Local Management Act. The case for the Vestry was that in consequence of a petition from some of the inhabitants of Shalcomb Street, a new street in the King's Road, the Vestry paved that street, and the fair cost of paving that part of the street, making the road, &c., contiguous to the premises of the defendant was 133*l.*, ordered to be paid one-half on May 1, and the rest in equal proportions on August 1 and November next. Mr. Smyth contended, first, that this was not a new street within the Act; secondly, that under the powers of the Paving Act notice should have been given to the defendant so that he might have the place paved himself; and thirdly, that the charges of the Vestry were exorbitant; and he had competent masons who could do the work for half the amount charged. Mr. Barstow said he had no power but either to make no order or to make it for the amount claimed. Mr. Smyth contended that the Vestry could either proceed by action or at a police-court. Mr. Barstow held that it was a new street, and made the order.

VACCINATION PROSECUTION.

AT the Eastbourne Petty sessions, P. Luck, who has appeared before the Bench on two previous occasions for refusing to have his child vaccinated, now appeared a third time. He pleaded not guilty.

The vaccination officer said, since the hearing of the last summons, notice had been given to the defendant, and he (witness) had called personally at the defendant's, and informed Mrs. Luck that the child must be done. The child had, however, not been vaccinated. The defendant —I have had no notice. Witness: I wrote a letter to you by my son. Defendant: It has not reached me. You ought to have sent a particular printed form of notice. A magistrate: It is not necessary; the Act does not say the notice shall be printed. Defendant: But when proceedings are taken a second time, the notice has to be gone through formally a second time. Another magistrate: It is nonsense to say that a printed notice is required. Defendant: But I have had no notice at all. The Chairman: Are you in a position to prove the service of the notice, Mr. Nicholls? Mr. Nicholls: The notice was delivered by my son, but he is not here, and I hardly know where to find him just now. The Chairman: As defendant insists on proof of notice, and that proof cannot under the circumstances be given, there is no alternative but to dismiss the case; but the defendant should understand he is liable to be summoned again.

ADVERTISEMENT HOARDINGS.

THE Queen's Bench has had before it the case of Reg. *v.* Willing—a case stated for the opinion of the Court by the General Assessment Sessions for the Metropolis, and which raised the question whether two hoardings used as advertising stations were rateable. Mr. Willing had erected hoardings in front of a villa which was to let, and also in front of a house which was being pulled down and rebuilt in Powis Place, Haverstock Hill, in each case under an agreement with the owner, which the Court held did not amount to a demise. In the one case the hoarding rested on the ground outside the garden wall, and was fastened to the railings which topped the wall and to a row of trees which stood behind. There were also struts running down to the garden behind for the purpose of steadying it. In the other case the hoarding was supported by poles, which were fixed into the ground inside the wall which surrounded the property. The question raised by Mr. Willing was whether he was in such exclusive occupation as to constitute him owner of a rateable hereditament. In the first case the Sessions had held that he was not such an owner, at the same time granting a case to the Assessment Committee; while in the second case they held that he was such an owner, but granted a case on the point to Mr. Willing. The Court now held that the question for decision in such a case is whether the person sought to be rated is 'in permanent and profitable occupation,' and that looking to the circumstances Mr. Willing was in neither case in such permanent occupation, but a mere licensee, and that he was therefore not rateable.

BRIEF NOTES OF CASES.

SCAVENGING.

1877. *Gay* v. *Cadby.*—Ashes from engine at a piano factory held to be trade refuse, notwithstanding that they were simply coal ashes unmixed with any foreign material. (W. N., 1877, p. 102; 36 L. T., 410).

WATER-SUPPLY.

1877. *Edwards* v. *Joliffe.* — 'Public Health Act, 1875,' § 64. Failure of water in wells vested in local authority owing to lawful excavations carried on by the plaintiff; whereupon other excavations by defendant as surveyor on behalf of the local authority. Injunction granted to restrain such works. Sect. 64 does not authorise a local authority to enter upon land and help themselves to water. (W. N., 1877, p. 120.)

COMMITTEE.

1877. *Cook* v. *Ward.*—'Land Drainage Act, 1861,' Sch. Pt. II. 6. Powers delegated to a committee. Every act done by a committee must be the joint act of the committee: it is not competent for them to apportion among themselves duties delegated to them as a body. (L. R., 2 C. P. D., 255.)

MARKETS.

1877. *Hughes* v. *Trew.*—'Markets and Fair Clauses Act, 1847,' § 19: Local Act. Slaughter-houses. Consent of local authority; how to be signified. Copy of a minute sent, appended to a letter by the clerk, held to convey a valid consent. Consent to one site particularly named held not to cover another site to which the slaughter-houses had been removed. Summons for infringement of exclusive rights held properly dismissed. (41 J. P., 276.)

Legal Notes and Queries.

LIGHTING AND WATER-RATES.

SIR,—1. Can a district be divided for the purposes of a lighting rate so as to exclude parties living at a certain distance from the highway or streets to be lighted

2. Similarly for a water-rate, so as to exclude a portion or several portions where mains are not laid? X. Y. Z.

[1. The powers of a Local Board, as regards dividing its district for particular purposes, will be found in sect. 211 of the 'Public Health Act, 1875.' 2. Water-rates are dealt with in sect. 56 of the same Act.]

NUISANCE—OUTFALL OF SEWER.

SIR,—The sewage of part of the town of A., in the district of the urban sanitary authority, is discharged into an open ditch, about 100 yards without the urban boundary. This ditch opens into, but is on a lower level than the river, so that the sewage matter accumulates in the ditch, where it remains until a high flood arises, when it is washed into the river. This ditch is in the district of the rural sanitary authority, who have called upon the urban authority to abate the nuisance caused thereby; but this body declines to have anything done in the matter, saying that, as the sewage matter is discharged into a ditch which is in the rural district, they can call upon the rural authority to abate the nuisance—a nuisance which is clearly caused by their wilful default. Please say on whom devolves the duty of abating this nuisance, and also whether the urban authority can be prevented from discharging their sewage matter in the manner above described.

J. G.

[The rural authority is not legally liable for this nuisance, except so far as it neglects to prosecute under sect. 108 of the 'Public Health Act, 1875,' the parties who are liable. That section seems to confer ample powers for nuisance above-mentioned.]

Reviews.

Laws of Health. By MICHAEL TAYLOR, M.D. Penrith: Hodgson.

THIS title was given to a lecture which Dr. Taylor delivered to the working-men of Penrith, and was written to point out the injury to health which is sustained by not attending to certain well-known facts. He did not dwell on what we should eat, drink, and avoid, but discussed only the subject of 'preventable diseases.' Amongst these he mentioned, not only small-pox and other diseases usually classed under this name, but scurvy, certain hereditary diseases, and affections arising from overcrowding, errors of diet, and dissipation. The bulk of the lecture was, however, devoted to the consideration of those diseases which are spread by infection, and he stated that he did not believe that all cases of cholera, small-pox, fever, and diphtheria could be prevented, but only a very large proportion, as a majority of those deaths 'are in direct opposition to the laws of nature.' He impressed on his audience the value of cleanliness, temperance, fresh air, good water, proper drainage, and avoidance of overcrowding, by means of which he hopes to mitigate to a great extent the fatality of these diseases. He barely touched on the necessity for isolation and disinfection in the prevention of infectious diseases, as these subjects were rather beyond the scope of his lecture.

The Sewage Question. By C. NORMAN BAZALGETTE, Barrister-at-Law, with Abstract of the Discussion upon the Paper. Edited by JAMES FORREST, C.E. London: Clowes and Sons, Printers. 1877.

Sanitary Papers Read at Edinburgh. By W. ALLAN CARTER, C.E. Edinburgh: Bell and Bradfute. 1877.

Remarks on the Sewage Question and Hille's System for the Disposal of Sewage and Sewage Sludge. By FRITZ HILLE. London: Warburton and Co.

WE are glad to see a reprint, by permission of the Council of the Institute of Civil Engineers, of Mr. Bazalgette's paper, and especially to see the full discussion at the end, in which General Scott, Lieut.-Colonel Jones, Mr. W. Hope, Mr. Bailey Denton, Dr. Frankland, Mr. R. Field, Mr. Morton, Professor Ansted, Mr. W. Crookes, Mr. Adam Scott, Sir Joseph Bazalgette, and many other well-known gentlemen took part. Mr. Bazalgette's object as an author was twofold; first, to limit and define the proper application of the various systems, which have been introduced, as a means of dealing with the sewage of towns, and secondly, to direct attention to certain subordinate questions arising upon the practical operations of these systems. The classification of the various systems adopted was: 1. 'Treatment with Chemicals,' including the 'Lime Process;' the 'A. B. C., or Sillar's Process;' the 'Phosphate of Alumina Process,' as practised by the Phosphate Sewage Company; the 'Goodall's Process,' as practised by the Clarifying and Utilisation of Sewage Company; the 'Bird's Process,'; the 'Dugald Campbell's Process,' and the 'Whitthread's Process. 2. 'The Application of Sewage to Land, including irrigation and intermittent downward filtration,' in which came under notice the systems in use at Barking and Merthyr. 3. 'The Dry Earth System,' with especial reference as to what would ensue were London to be treated on the 'Moule's Earth Closet' principle. 4. 'The Liernur, or Pneumatic System,' instancing the results obtained at Leyden, Amsterdam, and Dordrecht, and severely criticising the poudrette; and 5. 'The Seaboard and Tidal Outfalls.'

In our issue of February 16 last, we gave in detail the various conclusions at which the author arrived, and have therefore little more to add in reviewing this reprint. During the discussion, which with contributions made through the secretary, occupies over 130 pages out of the 190, some most interesting information was given relative to the 'Sewage Question and the River Thames,' and this portion of the subject is illustrated by two engravings, showing sections of the river Thames at various well-known places, where it has been said that the bed of the river had considerably silted up. Some of the speakers, especially Messrs. Shelford and Shoolbred, seemed to hold that rivers were so silted up, when sewage was poured into them, and Sir J. Bazalgette, in reply, gave a full vindication of the plans adopted with regard to the sewage of London and the outfalls. This portion of the work is perhaps the most interesting of the whole, and our metropolitan readers who have been dreading the raising of the Thames bed will do well to procure the book, and study attentively the whole question, in the light of experiments which have been made for fifteen years. The Metropolitan Board of Works and the Thames Conservators have both made, from year to year, accurate sections of the Thames, showing the amount of deposits which had taken place, and the result is apparently most satisfactory. The whole speech was a thorough vindication of dealing with sewage in seaboards, tidal rivers and estuaries, by sending it to the ocean, and reference was made to the proposal of Sir John Hawkshaw to carry the sewage of Glasgow some twenty-four miles below the city.

We presume that the work can be procured at the Institute of Civil Engineers, Great George Street.

Mr. Allan Carter, in two papers entitled 'Methods of Sewage Removal,' and 'The Disposal of Sewage' gives a very good description, and criticises very fairly the various processes and systems which have been adopted; but we do not propose to quote any of his remarks for the simple reason that the matter is now prominently before the scientific world from every point of view. The Liernur system of drainage is also ably treated by Mr. Carter, who says everything that can be said in its favour, after paying a visit to Holland in order to inspect its working. We have also in this volume an excellent opening address to an Engineer's Society, in which the recent progress of engineering science is cleverly handled, and a most excellent paper upon 'Combustion and Prevention of Smoke.' Since Mr. Spence's paper, published in 1866, nothing so

good upon this last-mentioned subject has appeared, at least that we are aware of.

Mr. Hille's pamphlet, is a thorough explanation of his own system of dealing with water-carried sewage, which we have often explained. We must perforce refer the reader to the work itself, which is a remarkably able production, and cheap at a florin.

Manuals of Health—Water, Air, and Disinfectants. By W. NOEL HARTLEY, F.R.S.E., F.C.S., Demonstrator of Chemistry and Lecturer on Chemistry in the Evening Class Department, King's College, London. London: Society for Promoting Christian Knowledge.

THE first peculiarity which arrests the reviewer's attention on taking up this little volume is that the date of writing or of publication is not to be found either on the title-page or anywhere else; and the reader who shall, in after years, desire to know the date of the book will have to find it out from internal evidence.

The book consists in great part of a series of extracts from excellent authorities; but there is a want of proper assimilation, and we are bound to say that the literary merits of the book are not of a high order. We quote the opening paragraph:—'The patriarchs of old dug wells for the use of themselves and their herds and flocks. Those they guarded jealously, and their servants sometimes fought for the possession of the water, and disputed the right of others to make use of them. Thus did the servants of Abraham and Abimelech fight for the well which Abraham had dug until an agreement made between them at Beersheba set the matter at rest,'

At the bottom of page 10 there is a characteristic bit of clumsiness, which we quote: 'The union of a base with an acid results mainly in the formation of a salt.'

As we have said, the materials used in the book are very ill digested, and the class of persons for which this book is intended will find great difficulty in understanding it.

Under the heading 'Organic Impurities in Water,' copious extracts (whole pages) are reprinted from Wanklyn and Chapman's book on 'Water Analysis,' and there is not one word of acknowledgment. The organic matter in water is sometimes expressed as parts per 100,000, and sometimes as parts 100,000,000; sometimes the results of the combustion-process and sometimes those of the ammonia-process being given.

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

PATENT SANITATION.

(*To the Editor of the* SANITARY RECORD.)

SIR,—I fear it is rather late for Mr. John Phillips to publish an illustration, showing an inferior modification of one of my patent ventilating traps as a new idea of his own, or as an improvement upon the old-built cesspool. No doubt it is a pity that such things as patents should exist, but at present I fear that Mr. Phillips, as well as other people, must take the world as it is. When an exorbitant price is charged for any patented article, there may be some grounds for complaint, but such is not the case, I consider, in this instance; consequently Mr. Phillips and all else concerned would do better to spend a few shillings in purchasing a particular than run the risk of being pulled up for infringement of patent.

Before taking out my patent, I examined all the documentary and other evidence that bore upon the case to see if any such trap as mine had ever been made and publicly vended for the ventilation of house-drains and soil-pipes in the manner intended by me, but I could find no evidence of such being the case, nor has such turned up as yet. The firm who purchased the sole right of manufacturing my traps in fire-clay had a large experience and connection in the fire-clay trade, and it is not very likely that they would pay away money for nothing. So I think Mr. Phillips ought to thank me for reminding him of the old Scottish motto—'Nemo me impune lacessit.'

In concluding, I beg to express my gratification at reading the able exposition which Mr. Phillips gives of the working of my system and the good results to be obtained from it.

H. P. BUCHAN.

124A, Renfield Street, Glasgow.

PADDLING THE WATER AS A MEANS OF AVERTING DROWNING.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Already the fine season has been ushered in by a number of deaths, some of them occurring in our very midst, from drowning. The means of safety, or relative safety, which I have to point out, are so very simple, and, as I believe, so effective, that I am lost in wonder that no one has thought proper to insist upon them, as in the following brief remarks it is my intention to do. Swimming, as ordinarily practised, is not the most sufficing means for escaping the dangers of the water. It needs some instruction to be able to swim, and practice to be able to swim well. No doubt it is desirable to swim, and to swim well. But the great majority of persons of both sexes do not know how to swim at all, yet unless people can swim, and swim well—and even then they are not always successful, when the emergency comes, in preserving life—swimming is, I am persuaded, not so effective a preservative as is conjoint paddling and treading water. As a rule subject to few exceptions, persons precipitated into the water do not swim without previously learning. But paddling with the hands and treading with the feet require no prior instruction, and in the great majority of cases would save life. In swimming, the mouth is on a level with the water in the intervals of the strokes; in paddling, the head is well elevated; the individual is able to look about, he can deliberate as to what is best to be done, and he is much less liable to take water into the larynx or glottis, a casualty which I am persuaded causes the destruction of many. Without prejudice to the art of swimming, I would have children exercised in household tanks from the tenderest age, in the act of paddling and treading water, so as to impart the confidence which unreasoning dread tends to lessen or take away when one is suddenly immersed in an unusual medium. The animal, the quadruped, begins to paddle at once when cast into water, but as man does not habitually employ the anterior limbs as organs of locomotion, reason must tell him that he may, if he pleases, employ them as organs of locomotion, in the water, just as readily as any four-footed animal. To be sure, a man has not the habit of using his hands and arms for locomotion, as the brute has, but otherwise how much more available is the paddle-shaped hand than a hoof or a paw. Again, the man with little or no instruction, by throwing his head well back, can float, and rest at pleasure, a thing of which the brute has no conception whatever.

Of course, a little preliminary habitude is desirable, but without any preliminary habitude or instruction whatever, there is nothing to hinder man, woman, and child, were they unable, in common parlance, to swim a stroke, from beating water with the hands and feet, just as the lower animals do, and so keeping themselves afloat for a protracted period, a period that in a multitude of instances would be found sufficient to invite rescue and preserve life. The action of the feet alone will sustain the body. The action of the hands alone will do so; *à fortiori*, the action of both will prove yet more effective. I have tried myself one alone, or both together—nay, with a single hand only—in bygone years, I am sure hundreds of times. There is no occasion for fuss or bustle. The body, taken as a whole, is actually lighter than water, bulk for bulk, and a

very moderate amount of paddling, with feet and hands, will be found perfectly adequate to sustain and guide its movements. In fact, so long as the individual paddles, as I here direct, he cannot sink. A horse, or dog, or cow, or cat, or swine, when immersed in water, begins instantly to paddle, and that without any prior instruction or exercise whatever. Now, a man, or woman, or child has only to do as the inferior animal does, and he, she, or it will float necessarily and inevitably. The place being otherwise safe and boats at hand, boats and ship's crews, a regiment of soldiers, schools, and the like, might jump into deep water, and paddle themselves into security without risk or failure. In this, as in many other things, man is too often unaware of his own immense capacities.

Animals not habituated to the water, will often take to it spontaneously, or, if cast into it, sustain themselves for indefinite periods. A horse, during disembarkation in Portugal, fell into the sea, and paddled about the harbour for a matter of six hours before it was secured. Washed or thrown overboard, the lower animals have been known to float for a long time. I knew of a mule which, having been washed overboard in the Bay of Biscay, paddled itself ashore, and then crossed country a couple of hundred miles to its previous quarters. The staff-surgeon in charge told me that, after leaving the Peninsula, the horses of the troop had to be thrown overboard in order to lighten the ship in a gale. The poor things, when they found themselves abandoned, faced round, and, so long as the ship commanded a view, were seen to battle with the wrack and wash for miles. A man on the coast of Lincolnshire, mounted on an old grey mare or other horse, used to swim seaward to vessels in distress, and thus rescued many lives. Recently, nigh Brooklyn, U.S., a dog took the water, and paddled, it is said, forty miles in search of his master. Dogs often gain the shore when ships and their crews have been lost. Some years ago a dog landed at the Cape of Good Hope with a letter in his mouth. The vessel to which he belonged had gone down with all hands, but if the men had but paddled as the dog paddled, all their lives might have been preserved. Indeed, I know for certain that formerly it was the practice at the Cape for men to paddle out—it was termed treading water—and bear communications to and from vessels in the offing when no boat would live. It was, and, I believe, is still, the case at Madras, similarly. Natives of the Island of Ioanna, in the Mozambique Channel, treading water, come out, bearing fruit on their heads, to the vessels miles distant. The young people in the islands of the Pacific breast the gigantic breakers out of mere sport. The Indians of the Upper Missouri traverse the impetuous current, invariably paddling and treading water.

Short instructions for paddling and treading water ought to be posted up in all schools, barracks, and bathing places; wherever, in short, people have to do with the sea or with masses of water. It should be shown how easy it is, with a little well-directed effort, to preserve life, and how the yearly and calamitous destruction which besets our shores now and haply for all time to come might be effectively stayed.

HENRY MACCORMAC, M.D.

Belfast, July 1877.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

BALL, Mr. Samuel, has been elected a Member of the Bulwell Local Board and Urban Sanitary Authority, Nottinghamshire, vice Walker, resigned.

CHATER, Mr. T. J., has been appointed Inspector of Nuisances for the Rugby Urban Sanitary District, vice Watts, resigned, at 80*l.* per ann.

DEACON, William S., Esq., has been appointed Treasurer to the Windsor Guardians and Rural Sanitary Authority, vice the Hon. Leslie Ruthven, deceased.

FIDLER, Mr. Samuel, has been appointed Collector to the Newbold and Dunston Local Board and Urban Sanitary Authority, Derbyshire, vice Bayley, resigned.

HALL, Edward, M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the Newtown and Llanllwchaiarn Urban Sanitary District, Montgomeryshire, at 40*l.* for one year.

LIVY, John, M.D., Univ. St. And., F.R.C.S. Edin., has been appointed Certifying Factory Surgeon for the District of Little Bolton, vice Garstang, deceased.

SWETE, Horace, M.D. Univ. St. And., M.R.C.S. Eng., has been re-appointed Medical Officer of Health for the Droitwich Urban Sanitary District, till 5th May, 1879, at 30*l.* per ann.

TOMKIN, Thomas Marchant, M.R.C.S. Eng., L.S.A. Lond., has been re-appointed Medical Officer of Health for the Witham Urban Sanitary District, Essex.

WALKER, John Davidson, L.R.C.P. Edin., L.R.C.S. Edin., has been re-appointed Medical Officer of Health for The Fylde Rural Sanitary District, Lancashire, and his salary increased from 60*l.* to 75*l.* per ann.

WATTS, Mr. Gerald, has been appointed Inspector of Nuisances for the St. Neots, Hunts, Urban Sanitary District, vice Martin, whose appointment has expired.

WOODS, Mr. C. Fletcher, has been appointed Surveyor and Inspector of Nuisances to the Penrith Local Board and Urban Sanitary Authority, vice Todd, resigned.

VACANCIES.

CANNOCK LOCAL BOARD AND URBAN SANITARY AUTHORITY, Staffordshire. Treasurer and Medical Officer of Health: 40*l.* per ann. Clerk: 75*l.* per ann. Surveyor and Inspector of Nuisances: 175*l.* per ann. Collector: 100*l.* per ann. Applications, 14th instant, to Thomas McGhie, chairman.

FENTON LOCAL BOARD AND URBAN SANITARY AUTHORITY, Staffordshire. Collector and Sub-Sanitary Inspector: 100*l.* per ann. Application, 30th instant, to Charles Adderley, Clerk to the Authority.

LOUGHBOROUGH RURAL SANITARY DISTRICT. Inspector of Nuisances. Application, 16th instant, to John Jarratt, Clerk to the Authority.

NEWTON AND LLANIDLOES RURAL SANITARY DISTRICT, Montgomeryshire. Inspector of Nuisances: 120*l.* for one year. Application, 19th instant, to Richard Williams, Clerk to the Authority, Newtown.

SLIGO. Certifying Factory Surgeon.

SANITARY PATENTS.

2077. Improvements in urinals. Benjamin Joseph Barnard Mills, Southampton Buildings, London. A communication from John Walter Osborne, Washington, Columbia, U.S.

2095. Improvements in valve apparatus for lavatory and water-closet basins, baths, and other similar uses. Alexander Melville Clark, Chancery Lane, London. A communication from Francis E. Kernochan, Pittsfield, Berkshire, Massachusetts, U.S.

816. An improved tonic preparation of liquid extract of beef or meat. Frederick Anderson and Joseph Yair, Cloak Lane, London.

2015. Improvements in apparatus for raising and supporting invalids and others in bed, also applicable to sofas, couches, chairs, and other incline rests. Caleb Trapnell, College Green, Bristol.

ABSTRACTS OF SPECIFICATIONS.

4042. Washstands. W. Thorburn.

A raised back is made hollow to hold a supply of water which is drawn off into the basin by a tap or valve. Below, at the back, is another receptacle for the used water. The hinged lid of the washstand has, interiorly, a mirror, presented when the lid is raised.

4068. Preservation of food, etc. W. E. Gedge.

Compressed gas is first sent into the vascular system to clear the vessels and cool the carcass. Then the system is infiltrated with a composition, made by mixing with sugar, pulverised carbon, benzoic, salicylic, and boracic acid gas; then treated with sulphurous acid gas, and the vapour of hydrate of phenyle; then adding a neutral solution of the alkaline carbonates, ammonia, potash, and soda, subjected to hydrate of phenyle and sulphurous acid gas. During transport the air is kept pure by escape of ammoniacal and sulphurous acid gas, or the like. A temperature not over 55° or 60° Fahr. is maintained by admitting ammoniacal and sulphurous acid gas from receivers, in which they are highly compressed.

4077. Chimney tops and ventilators. R. Wagstaff.

A cylindrical tube has a bell mouth above, over which is fixed a double cone piece; the whole is enclosed in a cylindrical casing. The products of combustion or vitiated air escape between the cone piece and the bell mouth, and an air current passes down within the casing.

NOTICE.

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Original Paper.

ON SOME SANITARY AND PRACTICAL APPLIANCES CALCULATED TO INCREASE THE COMFORT OF DWELLINGS;

BEING DESCRIPTIONS OF RECENTLY PATENTED INVENTIONS IN REGARD TO VENTILATION OF IMPROVED CLOSETS, SLOP SINKS, AND OTHER HOUSEHOLD ARRANGEMENTS.*

BY JOHN LANYON,

Fellow of the Royal Institute of British Architects.

ONE morning some two years ago, I was much surprised and disappointed to find at a country house I had designed and the greater part of which was sufficiently finished to enable the family to take up their residence in it, that in the upper corridor the smell from the closets was most unpleasant. The closets themselves were large and lofty, with ample windows, and fitted up with Underhay's patent valve apparatus, and had in addition powerful top extracting ventilating flues. On examination the cause was very evident: the windows which were open, were on the exposed side of the house, and instead of the disagreeable smell making its escape through the ventilating flues, it was carried by a high wind, then blowing, through the doors of the closets and into the corridors. I began at once to think how this state of things could be remedied, and subsequent consideration and experiment led me to devise the simple appliances which I now desire to bring before you, in the hope that you may deem them worthy of your approval.

I first considered the possibility of getting rid of, entirely under all circumstances, what I may call *surface gases or smells.* This is a serious matter, and one which up to the present has not, I think, received sufficient consideration from our profession. I could not help feeling, or perhaps I should be more correct in saying 'smelling,' that the ventilation system adopted (being that of extracting flues in the ceiling) was not a sufficient one, and the question with me was, how I could try to overcome this difficulty. I saw no way for it but to go to the root of the evil, and endeavour if possible to remove all the natural gases as quickly and as perfectly as the solid matter is removed by the better class systems of water-closets, etc., so as no longer to affect any of our senses.

At this stage arose the further consideration of the possibility, not to speak of the desirability, of carrying away all other disagreeable and some of them most dangerous and deadly gases which up to the present time are, I believe, freely discharged in a very unwholesome manner in many, indeed I fear in most, of our dwellings. I refer to the noxious gases evolved from and through our 'jaw-boxes,' slop sinks, gully traps, and lastly, but by no means least, from our kitchen ranges. It is almost needless to call your attention to the well-known fact that in a large majority of the houses of the present day, and of every class, the smell produced by cooking is simply intolerable, and most prejudicial to the health, and to the physical and mental enjoyment of all, and especially of those whose systems are wearied and exhausted by their daily labours.

The foregoing desirable objects will, I believe, be accomplished by the use of the ventilating cowl and flues which I have patented. A short general description of some of the various apparatus may be of use.

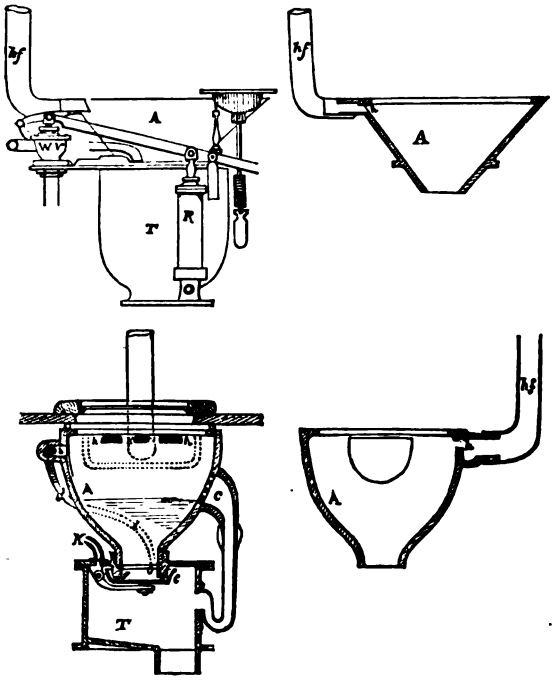
Let us look at the ordinary close kitchen range, from which there is as a rule little or no ventilation for smells, etc., arising from what is being cooked on the top of it or before it. The cowl already referred to is simply a half domed covering or canopy, starting at the height of the top of the ordinary frame or moulding round the range; at the front it projects slightly forward so as the better to collect and catch the steam and gases that may be forced into the kitchen by the process of boiling, broiling, stewing, etc. It is carried back in a sloping direction to the line of the wall or of the back plate of the range, and where these two meet at the highest point are either one or two openings into extracting flues, which flues should, in all new work and where possible, very shortly be joined into a special ventilating flue carried as close as possible up alongside of the smoke flue. The upcast in the extracting flue is produced by utilising the heat after it has done its work in the range, to rarefy the air in a small chamber at the back of the range, and this is done by simply forming the smoke flues in cast or sheet iron, instead of building them in brick and carrying them up in this manner to the main smoke flue. The spaces between these flues become the hot-air chamber above referred to, and by introducing gilled perforations in some places in the back plate of the range above the hot plate level, the gases and smells are drawn into this chamber and carried away by the extracting flues, which open half from the cowl and half from the top of the hot chamber. The upcast draught which is formed in this chamber absorbs all the gases and smells that ascend into the cowl, thereby preventing their escape into the kitchen. In cases where it is desired to introduce the ventilating cowl to existing ranges, and where there are no special ventilating flues up the chimney, the hot-air flues are discharged into the smoke flue at a higher level than the top of range opening, and regulated by a damper, so as not to interfere with the draught of the range. In many such cases the canopy would have to be dispensed with, but then the extra thick chimney breast would act in its place.

In the W.C. the extracting foul air flue is at the top of the basin, so that all gases directly evolved are removed. Likewise in all slop sinks, jaw boxes, and gully traps the cowl retains, or rather directs, the upward course of the smells and gases given off, until they are carried away by the extracting flue, this latter being always at work, the gases, etc., must be drawn into same, and cannot be discharged into the chambers in which the various necessary household sanitary appliances are usually placed.

The upcast draught in flues, other than those from the kitchen, are produced either by some of the well-known mechanical ventilators, such as Boyle's, Howorth's, Banner's, etc., being placed on the top of the flue, or by taking advantage of the waste heat from a kitchen range, gas stove, hot-water cistern or pipes, heating apparatus, etc., and I think in most cases both systems can be used with advantage, and a little care and forethought makes all this arrangement very simple.

* Read at the Royal Institute of British Architects, Jan. 8, 1877.

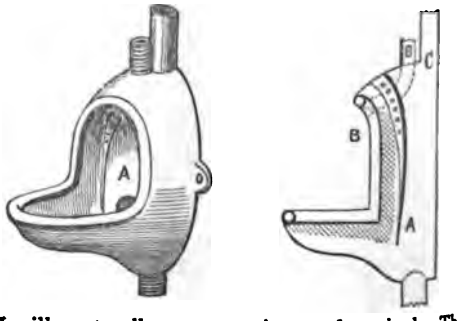
I will now refer to the W.C. arrangements. The ventilating portion of this consists of the basin, at the back of which are three openings. These are the mouths of the extract flues which should discharge into a separate ventilating flue for the use of the closets, the action of which I have already described. From the trunk of the closet is taken a small



separate ventilating pipe which may discharge some six feet or so above the closets into the ordinary ventilating pipe from the soil pipe. The object of this pipe is to carry off those gases which may either force themselves through the trap or become developed in it, and thus prevent the very usual and disagreeable rush of sewer gas into one's face on opening the valve or pan. The next point I should call your attention to is the formation of the valve itself. There can be, I think, but little dispute as to the valve being the best form of closet, so long as the valve can be kept from leaking and the basin from becoming dry, thus preventing sewer and other gases from rising into the chamber. On the outside of my valve, I raise a rim about 1¼ in. high, standing up round, but clear of the throat of, the seat of the side valves. This arrangement must secure a complete seal of water at all times, even if the valve were to leak; the rim is well splayed so as not to allow of any matter catching on it, but in addition I have introduced a jet of water through the top plate of trunk, which during the time the valve is kept open, discharges obliquely over it, thus completely removing all matter that might accidentally adhere to the face or rim of the valve. It is of course most desirable that the lid should be closed down immediately after the closet is used, in order to prevent any smell from arising, and to facilitate this I have adopted a lid only 2 in. wider than the size of the hole in the seat, and which is so light there is no trouble in opening and closing it. This of course leaves the handle quite free. In this small lid there is a piece of glass, so that through it can be easily seen without again raising the lid, whether the flush has been perfect in its action or the reverse. If it should be thought desirable, a simple mechanical arrangement can be introduced which, on the seat being vacated, will close the lid. Thus the closet would be automatic in its action, but I think in many cases this would be unnecessary. For the greater facility of connecting the necessary pipes, union couplings are introduced, and in order to keep as far as possible the flush water at its fullest power, it is taken direct from the valve to the basin, without the usual bend at the side of the valve. The patent ventilating basins are also applied to the pan closets, they are of course less expensive than the patent pan valve closets, but are equally successful in their action; indeed, in many places where the closet is used as a slop sink they are most invaluable, as all smell is carried away; in such cases I would recommend the use of a somewhat stronger basin.

The flush water is introduced at the side by means of the ordinary fan. It rushes round the back and front and meets at the opposite side, thus thoroughly cleansing the basin and carrying away all matter most effectually. The shape of the basin of the pan valve closet, and the height to which water rises in it, prevent the possibility of the sides becoming soiled. The basins can be fitted to any closet.

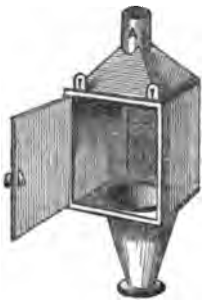
In positions where exterior fresh air and light are an impossibility, these closets are, I think, most invaluable and efficacious, as there the light and ventilation go hand in hand. The closets should be illuminated by a close lamp, as indeed all closet lamps should be, and the pipe from the lamp should be taken into the extract flue, and thus the flame of gas or other light both illuminates the closet and causes the up-draught at one and the same time. I may mention that for all places where closets are used in rapid succession, these closets are most desirable, as there is no trace left in them of having been just previously used.



I will next call your attention to the urinal. The arrangement here is that the body is a sort of double case, a plate separating the front or open part from the back, which is thus completely closed off. The action which takes place when the urinal is being used is, that the urine is driven back, under and behind the face plate, by the flush of the water discharging from the flush pipe over the face of the above-mentioned plate and into the projecting bowl. Any gases or smells that may afterwards arise from the urine must go up the back of the said plate and into the extract flue. There are also perforations at top of the face plate which permit any smells arising from the external or exposed water to be drawn off by the extract flue. The use of the apparatus should with proper care entirely relieve us of the disagree-

able smell so remarkable in most of the urinals that I am at present acquainted with. These urinals can be formed either singly or in groups. There is also a cheaper form of the urinal in which the ventilating cowl covers but little beyond the opening into the waste pipe, and the bowl is sloped down quickly to this point, and as the smell arises principally from the trap it must be carried off by the ventilating flue.

The next diagram shows the ventilating cowl applied to slop sinks. It is simply a domed covering



to the ordinary slop sink with a door at the side, so formed that the slops can be easily emptied into the sink, but that the gases and smells usually so disagreeable from all such places must be carried away by the extract flue. The upper part is sufficiently large to admit of the slop pail being left standing upside down in it to drain. The jaw boxes more closely resemble the cheaper form of urinals. The box falls toward the lower end, where the waste is, over which and a little larger than its opening is the ventilating cowl, so that all gases arising must be carried away by the extract flue. As a rule, the time when jaw-boxes are most disagreeable and dangerous is in the night, or after there has been a large quantity of hot water discharged down them. The reason of this is of course well known, but by the use of the ventilating cowl all dangerous gases would be prevented from getting into the house. In addition, the jaw-boxes themselves have covers, which, when closed, compel all the smells they may retain from dirt and grease to be carried up the extract flue. The same principle applied acts equally with regard to gully-traps, stable drains, etc.

In the discussion which followed the reading of the paper, the President asked what was a 'jaw-box.'

Mr. Lanyon replied that it is perhaps more an Irish term than an English. It is the place where in ordinary houses dishes, etc., are washed up; in other words, the 'sink,' which in Ireland is called the 'jaw-box.'

Mr. J. Fogerty, referring to the so-called 'ventilating water-closet,' said that the main conditions are dependent entirely, in the matter of ventilation, upon the maintenance of a continuous draught of air through the up-cast tube. If that cannot be insured at all times and under all circumstances, it is impossible to rely upon that small apparatus alone for ventilation, and he doubted whether people generally would bear the expense of a continuous gas-light burning within that ventilating flue. He also doubted whether the apparatus itself will so far extract the objectionable gases as to render them innocuous. The difficulty in most closets is the sudden escape of gas caused by displacements below the valve when the water rushes in to the receiver. Mr. Underhay in his latest improved apparatus has succeeded in reducing this escape to a minimum, and Mr. Fogerty thought, with his improved valve closets, this plan of ventilation is unnecessary, and is especially objectionable, because it removes the flushing-pipe from behind the seat to the side. His opinion was that the best thing to adopt in general cases, is chemical disinfectors; but in a well-constructed water-closet there ought to be no appreciable escape of gas; at the same time, disinfection may be desirable, especially in hospitals and public institutions. Anyone who attempts to construct 'extracting flues,' unless he can place them in connection with a closed furnace-shaft constantly at work, or can exhaust them by mechanical means, will invariably find them to be down draughts instead of up-cast shafts. This remark applies equally to the ventilation of houses and mines.

The great fault in water-closets generally, is the carelessness with which plumbers form a trap in the 'safe' under the seat, and its connection with the soil-pipe. The use of the 'safe' is to catch any accidental overflow of water that may occur, and there is usually a small pipe called a 'leech' pipe fixed over the trap to allow water to trickle into it, and so keep it sealed; but when the water ceases to flow, as it generally does in two or three weeks, there is a direct communication opened between the soil-pipe and the room, and in nine cases out of ten in London houses that is the cause of the worst smells. The remedy is to disconnect the pipe leading from the safe trap, and carry it through the outer wall or down a rain-pipe, or something else which has no connection with the sewer. Mr. Fogerty knows nothing more perfect than the improved closets of Messrs. Beard, Dent, and Hellyer, and also those of Mr. Underhay.

There is a new form of 'slop sink,' with a ventilating cover, of which a model has been placed in the Curator's Museum at the Royal Institute of British Architects. When the cover is thrown up, it opens a connection between the outer air and the interior of the slop sink, but it is open to objection when placed in a position where the air can be drawn in. As regards the 'urinal,' Mr. Fogerty thought there would be ample flushing power; it will be sufficient with the usual disinfectants.

A most useful adjunct to extracting flues is the invention of Mr. Boyd, the curator of the Architectural Museum. One of the difficulties of constructing such flues is in arranging a number of them together to be carried up in one shaft. To obviate this difficulty, Mr. Boyd has introduced vertical iron flue plates, which save immense trouble and give great advantages. Two heated surfaces on each side of the smoke flue are obtained, and in that way an 'upcast' at small expense, which can be depended upon when fires are in use; but valves such as Boyle's are necessary to prevent sudden down-draughts.

Mr. Ernest Turner said the subject brought under notice by Mr. Lanyon was a very important one, as 'the health of the people is a supreme law,' and the drainage and exclusion of foul air are the first things to be attended to in the dwelling in order to bring about the desired result. The water-closet described aimed at carrying off foul air, and under certain conditions it would do so; but he held that one event which it is intended to obviate ought never to arise—the percolation of sewer gas through the water seal. If the drains be properly constructed and ventilated, there should be no accumulation of gas in the soil-pipe at any time, and if the conditions of the atmo-

sphere were so unfavourable that any should possibly pass the D trap, a pipe, or, better still, two pipes inserted in the box, and communicating with the outer air, would effectually prevent its passage through the water above the valve. This being admitted, the value of Mr. Lanyon's invention is limited to the removal of foul air at the time of voidance; but this alone is really of sufficient importance, especially in hospitals, to merit our serious consideration, and we may congratulate Mr. Lanyon upon having devised an original scheme. It may, of course, be asked, 'Is the game worth the candle?' (or the gas). In small private establishments probably not, but in hospitals and large institutions he should say certainly, 'Yes, we cannot take too great precautions.'

Mr. Turner also desired to call attention to the additional care which would have to be taken in fixing the apparatus, or else, while fulfilling one sanitary requirement, another would be neglected. The fact of the valve being 'lipped' necessitates a greater depth of the 'box' or 'trunk' for it to work in, the result being that the apparatus stands an inch and a half higher than the ordinary one. Now, although an inch and a half does not seem much to talk about, still it makes a very considerable difference added to or taken from the height of a seat, and closet seats are already generally made higher than they should be. It is of course easily obviated by a step in front of the riser, and it would be well if the seat were never more than fifteen inches from the floor or step. The reason for this is, that the more acute the angle of the body with the thighs the greater the relaxation of the abdominal muscles. With delicate people this is very important. Another reason specially applicable to the present case is, that by this lowering of the seat the opening is more completely covered by the body, and the ventilator more efficiently performs its function when it is most needed.

With regard to urinals the same remark applies that has been made about the closet—that very little, if any, offensive smell should emanate from the waste pipe, provided there is a proper supply of water. The cause of anything disagreeable is, generally, too great a surface exposed and want of cleanliness. If Mr. Lanyon would turn his attention to the improvement of public urinals, he would really be a benefactor to society. What appears necessary is, that there should be as small a surface as possible exposed to the contact of urine; that the lip of the basin should project further than at present; that the divisions should not project far, so that those entering the places would, in common decency, use the receptacle provided for the purpose; and that, above all, there should be a constant water-supply.

Mr. C. F. Hayward remarked that one substance leading to great disagreeableness in a house is grease; and some of the greatest practical difficulties in drainage result from the neglect of the means for getting rid of it effectually by the sink, which is often spoken of as a thing which will convey anything offensive to the drains. It is important to insist upon the proper provision for conveying away, otherwise than by the drains, the quantity of grease and other similar substances resulting from the washing done upon the scullery sinks. The hot water used melts it sufficiently to enable it to proceed some little way down the pipes, and then, cooling as it goes, a deposit is made more or less thick of all the collected gritty dirt and filth; which is, perhaps, often again partially melted and augmented with heavier matter till it forms a hard coating in the pipes, and a dense mass in the drain trap. It thus becomes one of the greatest practical difficulties in preventing their proper action as well as one of the greatest nuisances, and the great attraction for rats. This may occur perhaps in the first week of a house being used, by reason of some hard substance being accidentally left in the course of the drain, around which the grease can collect and adhere, and so the healthy working of a house may become stopped at once. Every time Mr. Hayward had had to build a house, large or small, he had been compelled to devise some particular apparatus whereby the grease might be prevented from getting into the sewer.

Mr. John P. Seddon said Mr. George Jennings has been making a good simple form of closet lately. It is a trapless one. Mr. Hayward could not see any necessity for any trap if the soil-pipe be carried up above the roof of the house and left open, and have its lower end terminating according to Field's Civil Engineer plan, with a short open culvert, to deliver the soil to the drain and so sever direct communication between the house pipes and the drain. A Banner's cowl should be applied to the upper end of soil-pipe, or better, to a ventilating pipe carried up from the culvert, so as to be continually drawing fresh air either down or up the soil-pipe. This, which is 'Banner's system,' makes houses absolutely safe from foul gases.

Mr. E. Turner, in answer to Mr. Hayward's question, said as to a trap for preventing grease from sinks from entering the drains, he discovered that one which fully answered the purpose had recently been patented as Dean's Grease Trap. There is no London agency, but they can be obtained at Edwards' Pottery Works, Ruabon. They are somewhat similar to Doulton's stoneware gully traps, but have an iron saucer which catches the grease, and is easily drawn up by an iron rod and emptied. Where there is a large quantity of grease Field's flush tanks may be used with advantage.

Mr. Lanyon, in replying upon the discussion, said that in the new Nurse's Home, Belfast, and in very many other places, the various apparatus described are in use, and in all cases the flues act perfectly and carry off all smell—which should completely negative all theory to the contrary. In no case has it been found necessary to use a jet of gas in the extract flue for the purpose of producing the up-cast; but in cases where artificial light is required the action is very perfect, as before stated. With regard to the disinfecting apparatus, Mr. Fogerty referred to one thing, however, to be remembered, viz., that in the case of all apparatus requiring the use of chemicals, the charge must be kept up, and as this must be entrusted to a servant, who must first remove the seat in whole or in part, it is likely to be overlooked. The apparatus would then soon be forgotten and cease to act, and the original cost would be a dead loss; but if you have an up-cast draught constantly at work, you do not require chemical agency to do what the current of air effects by natural laws. In the Nurse's Home, above referred to, the up-draught is provided by simply taking a 3-inch pipe from a heating chamber at the back of the kitchen range below the level of the top plate of the range. It discharges into the lowest part of the flue, which ventilates all these water-closets and slop-sinks, and the extraction acts per-

fectly. There is no smell either from the closets or the sinks, and on the top of the flue I have a Boyle's ventilator. Directly any closet has been used, the lid should be closed down. All smell arising from matter in the basin is then carried off together with the upward rush of gas caused by the opening of the valve or pan.

So far as regards the position of his flush, Mr. Lanyon said that he found it acts better than having the flush at the back, as the back and front parts of the basin being those most liable to get soiled, have the strongest current of water over them and thus get thoroughly cleansed, and the fan itself cannot become covered with filth.

In reference to Mr. Turner's remarks on the apparent increase of the height of the closet seat required for his patent, Mr. Lanyon said that would appear at first sight to be the case, but in practice it is not so. The closets that have been put up are of the ordinary height. Indeed in many cases the ventilating basins have been introduced into existing closets without any difficulty or change in the seat. Speaking of urinals, the object of the urinal was to reduce the quantity of water in the front, and it will be seen that in it the water space is reduced to a minimum, and with it the danger of smell.

THE

SANITARY RECORD.

FRIDAY, JULY 20, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

THE DANGERS OF OUR WATER-SUPPLY SYSTEM.

THE remarks on the subject of the London water-supply contained in a recent article in THE SANITARY RECORD are illustrated in a very significant way by some facts disclosed in the letter of a correspondent of *The Builder* the week before last, and by some statements which have come from the parish of Rotherhithe. The correspondent of *The Builder*, who writes from the Brompton Road, states that on Saturday fortnight a lad came to his yard and asked for a kettle of water; and, being curious to ascertain the reason for this request, he accompanied him to his home in Walton Street, Chelsea. There, he says, he found 'eighteen persons living without water, the closets stopped, and the house converted into a fever den, the water having been cut off five weeks.' The reason given for the existence of this state of things was that the lad's father, who, it appears, rented the house, containing eighteen persons, had been committed to prison at Holloway through being unable to pay his parish rates, owing to a falling-off in his business. The mother of the family, it was stated, had offered to pay the water-rates which were due. But the officers of the company would not accept the money tendered because a certain sum in advance was not offered, in compensation for the previous non-payment of the amount in arrear. The woman being unable to raise the extra sum demanded, the water-supply was cut off, with the result already referred to. On a second visit to the waterless house, the correspondent of *The Builder* found that the stench prevailing in the place was terrible. He added that there appeared to be something very strange in the mode of levying the rate, the water having been cut off on May 15, though the rate was not due until June 24. The first quarter's rate, which, as we have seen, was refused by the collector, had been tendered to him 'before several witnesses.'

We believe that the case just stated is only one example of a great number of similar instances. First, as to the practice of the water-companies. We believe most of these bodies claim the right to demand their rates in advance—on what ground of justice or equity we do not pretend to say. We do not remember whether this claim has ever been supported by a legal decision in favour of the companies, but it is altogether opposed to the practice of other trading corporations, and it is certainly a most inequitable claim. The claim, however, is not enforced in the case of those of the general body of water consumers, who are known to rate collectors as 'respectable payers,' and some of the companies in the case of these 'respectable payers,' are content to collect the rates for the half-year, after they have become really due, instead of in advance. In the case of the poor, however, the companies are more exacting, and in the instance under discussion it would appear that the water was cut off on the plea that a rate due—that is to say, due in advance—had not been paid.

Now if the case as we have given it be substantiated—and, judging from other and similar instances, there seems no reason to doubt in the least the statements to which our contemporary has given publicity—it reveals what is nothing less than a scandal, and shows the dangerous unwisdom of permitting the water-supply of the metropolis to remain in the irresponsible hands of private companies. So long as the supply of an article so indispensable for all sanitary purposes is left, as it practically is, at the option of such private corporations, so long will it be impossible to prevent the perpetuation of the present dangerous system. The correspondent of *The Builder* very properly remarks that the water-supply ought never to be stopped without the permission of the sanitary authorities; and even if the company obtained a magistrate's order to cut off the water, such an order should be subject to the correction of the sanitary authorities, who would then have to accept the responsibility of the situation.

We go further than this. Whatever legal proceedings it may be deemed right or just under the circumstances to take, we can conceive of no instances in which it would be justifiable to cut off the amount of water required by a household for sanitary purposes. The stoppage of the water-supply involves a distinct danger, not merely to the particular household immediately affected, but to the community at large.

It will, indeed, we think, be recognised, when the question is looked at from this point of view, that it would have been as reasonable and justifiable to cut off the connection of a particular house with the main drainage because its occupier was in arrear with or unable to pay his parish rates, as to cut off the water-supply of a house because of the non-payment from a similar cause of the water-rate.

From Rotherhithe the statement comes that the district is in a very lamentable condition, owing to the great scarcity of water under which the inhabitants are suffering. It is scarcely credible, but it is actually avowed that in one part of the parish there has been no water obtainable 'for several days,' and that on the occasion of two recent fires the danger to the public was greatly augmented on account of the circumstance that no water could be obtained until some time after the arrival of the fire-engines. To make matters worse, the vestry, or rather the vestry's servants, the dust contractor and his men, have been neglecting their duties. 'Refuse of every description is accumulating,' and, at the time this statement was made more than a week had elapsed since a dust cart had been seen in the neighbourhood. A sort of threat has, it seems, been used towards the offending contractor by the parish surveyor, who intimates that his (the dust contractor's) 'cheque' will be withheld, unless he properly performs his contract. There is some talk, it seems too, of 'waiting on' the Home Secretary or memorialising the Board of Trade, on the subject of the deficient water-supply. The state of affairs is undoubtedly most serious, and the evil effects are likely to be enhanced in consequence of the heat of the weather.

What makes this question all the more serious, is the fact that many things of this kind happen which are not brought prominently under public notice. It is often a mere chance that the reports of vestry meetings at which very startling facts are often stated get into the daily or other important papers. The local journals publish them and perhaps devote indignant editorials to the discussion of the abuses which crop up from time to time. But there the matter ends. No reforms are effected, and the general public, as we have seen, are left in ignorance even of what has happened. This is one of the great disadvantages of the existing system of Metropolitan Local Government. Things are done in a hole-and-corner sort of way by the vestries and district boards. Local Government is, in fact, carried on in the dark, and there is not likely to be any improvement until things are managed by an efficient central board empowered to review local proceedings, and it is doubtful even under the new sanitary bill, whether the Local Government Board will prove to be such an efficient central governing body.

As to the water-supply, however, we repeat that the power given to the water-companies to cut off supplies is a most dangerous one for the public health, and it is a power which is continually being exercised by these companies; and to this fact is due, we believe, in a much greater degree than the public have any conception of, the continual recurrence of epidemic diseases in the poorer quarters of London. The experience of the present small-pox epidemic, amongst others, has shown that the better classes in the healthier suburbs suffer from the ravages of diseases which have been originated in the poorer districts by the causes already suggested. It is quite time, indeed, that there should be a strong expression of public opinion on the question of the water-supply of the metropolis and of our large towns. Such an expression of opinion would support the contemplated action of the municipal authorities in the direction of buying up the existing companies, and having the entire supply of water placed under central management by the municipal authorities. Not, indeed, until such a plan is adopted, and the system of supply properly controlled by the duly appointed sanitary authorities will the public be free from danger.

PUBLIC HEALTH (METROPOLIS) BILL.

MR. SCLATER-BOOTH has issued 'a statement showing the object and general effect on the existing law of the Bill.' It begins by setting out the Acts which were repealed for all England, except the metropolis, by the Public Health Act, 1875, and were consolidated in that Act. That it is now proposed to consolidate as many of those Acts as concern the metropolis, so as to complete the work then left undone, and that the bill is therefore strictly a consolidation bill, with the addition only of a few new provisions specially noticed. The objections taken to the bill by the vestries and the district boards of the metropolis, who have unanimously petitioned the House of Commons against it are, that if the Local Government Boards have had these powers, they have not, but with one exception, which is considered to be doubtful, exercised them since 1871, so that there can be no need of re-enacting them in their present form; secondly, that they are so altered by being removed from their context, or by so-called verbal amendments, as to admit of a different interpretation to that which would be put on them as they now stand; thirdly, if it be merely or chiefly a consolidation bill, what was the reason for the second reading being taken before it was printed, and why is it pressed forward now, after the metropolitan

local authorities have unanimously petitioned against it, and have requested full time to consider its clauses? They admit that the proposed additions to the law are decided improvements, and wish them to be carried out, and would willingly see them eliminated from the old sections, and passed this year, so as to give time for a full consideration of the present state of the sanitary law of the metropolis. Having these objects in view, the conference of vestries and boards of works at Shoreditch Town Hall have instructed Mr. Walker, the vestry clerk, to draw up a list of objections to the bill for the consideration of a committee appointed to assist in opposing the bill, or at any rate, to prevent the consolidating clauses from being re-enacted in their present form.

The objections to the bill, to a certain extent, are beside the mark, as the objectors do not admit that the Act of 1871 did really transfer the powers then possessed by the Secretary of State and Privy Council under the Acts now proposed to be consolidated. This appears to be a decided mistake, as the preamble to that Act commences as follows: 'Whereas it is expedient to concentrate in one department of the Government as hereinafter provided, the supervision of the laws relating to the public health, the relief of the poor, and local government, be it enacted,' etc. The second section and schedule of this Act incorporate all those Acts under which the Secretary of State and Privy Council had any powers to issue regulations or override the metropolitan sanitary authorities, so that it should have received more consideration than has been given to it, and the present state of the sanitary law more fully discussed.

The real question at issue, therefore, seems to be whether or not it is necessary to re-enact or consolidate for the metropolis certain sections of Acts passed in 1855-66, however advisable it might have been to have done so for extra-metropolitan districts. Those in favour of and against the bill seem, except as regards the Hackney Board, to have forgotten that other authorities have to provide main drainage and a water-supply for their districts, as well as, if they be urban authorities, to carry out the provisions of the Artisans' Dwellings Act, and to provide hospital accommodation not only for non-paupers, but when they are also guardians for paupers suffering from infectious diseases; also to make by-laws for the erection of buildings, and other important matters. Now, except as regards non-pauper patients, the local sanitary authorities of London have not to provide for any of these matters. Besides which, public opinion is now so strong in the metropolis, that no glaring instance of neglect of a sanitary duty would be allowed to continue. As also it is admitted on all hands that this bill does not consolidate the whole sanitary law of the metropolis to the same extent that the Public Health Act, 1875, did for the rest of England, and also that many additions beyond those now proposed should be made to the existing sanitary laws, is it wise to push on the bill, instead of leaving it to next session, when it might be fully and fairly considered? The question could then be satisfactorily discussed as to what powers, if any, are now necessary for the issuing of regulations by a central authority for checking the spread of infectious diseases introduced from abroad, as well as of those prevailing here, more or less, at all times; for preventing injury to health from the erection of insanitary dwellings; the prevention of overcrowding and other matters; as well as the authority in whom such powers should be vested. There is no doubt that the by-laws in force in many extra-metropolitan districts are far in advance of any regulations at present existing in London, and we do not see why this cannot be amended, either by act of Parliament, or by giving power to the local sanitary authorities to make such by-laws, without any unnecessary interference with local self-government, so dear to most Englishmen, and so advantageous to the well-being of the country at large.

Notes of the Week.

THE York City Council intend to erect public baths in St. George's Field at a cost of about 5,000*l.*

THE Hastings Town Council have resolved to borrow 10,000*l.* for laying out a new public park.

THE Rotherham Town Council have decided to borrow 18,500*l.* for construction of new markets and slaughter-houses, with new streets.

THE Governors of St. Bartholomew's Hospital have resolved to rebuild the theatre, museum, and library, at a cost of about 50,000*l.*

THE Town Council of Newport, Monmouthshire, have been appointed the Port Sanitary Authority until September, 1878.

THE Local Government Board have consented to the formation of local boards at Kenilworth, Warwickshire; Kirkleatham, Yorkshire; and Wirksworth, Derbyshire.

THE Hospital Sunday Fund, resulting from the simultaneous offertories gathered in the London churches three weeks since, now amounts to over 25,000*l.*

MR. WILLIAM GIBSON has been appointed assistant surveyor to the Withington Local Board, at a salary of 150*l.* per annum. There were sixty-four applicants for the post.

MR. G. E. THOMS, engineer and surveyor to the Great Crosby Local Board, has been elected borough surveyor for Wolverhampton, at a salary of 500*l.* per annum. There were fifty-two candidates.

A CORONER'S jury, sitting at Rochester on the body of a boy drowned whilst bathing, has passed a resolution of censure upon the trustees of the Watt's Charity for not having provided public baths for the locality, although their scheme has for many years enabled them to spend 2,000*l.* in the erection of a suitable place and 200*l.* a year for its maintenance.

SMALL-POX is declining rapidly in London. The fatal cases in the last four weeks were 78, 44, 23, and 32 respectively. At the same time, the numbers in the hospitals were 966, 664, and 641.

DR. FRANKLAND reports that during June the Southwark Company supplied water which was turbid from inefficient filtration, the suspended matter being 'full of moving organisms.'

SPECIMENS of the Colorado potato beetle, accompanied by a pamphlet, written by Mr. H. W. Bates, describing the habits of the insect, have been presented to the Royal Botanic Society Gardens, Regent's Park.

THE Senate of the University of London have by a considerable majority decided in favour of admitting women to degrees in the other Faculties, as well as in the Faculty of Medicine.

IT is stated that no fewer than twenty-five boys have been drowned in the river Thames while bathing since June 1. The body of a lad has just been picked up near Lambeth Bridge, and removed to the new Lambeth mortuary, to await an inquest.

THE Chatham Local Board of Health and the rural sanitary authorities have resolved to apply, through Colonel de Butts, R.E., for a grant from the War Office of twenty-seven acres of land, in addition to that already allotted, as a recreation-ground for the inhabitants of Chatham.

IN order to extend and improve the elementary teaching of physiology and the laws of health in elementary schools, the National Health Society, 44, Berners Street, has placed at the disposal of the London School Board, in addition to a sum of 100*l.* previously offered, a further sum of 25*l.* annually for four years for premiums to teachers and children who pass the best examinations in these subjects.

A RETURN has been issued of all deaths in the Metropolitan District in the year 1876 upon which coroners' juries have returned a verdict of death from starvation, or death accelerated by privation. In the general division of Middlesex there were 20 such deaths; in the Eastern division, 19; in the Western division, 3: in the City of London and Borough of Southwark, 1; and in Westminster, 1; giving a total of 44 deaths.

THE Epping rural sanitary authority has recently received and accepted the decision of the Lords of the Treasury as to the terms on which the water and drainage works—carried out in the town of Epping by the Local Government Board in their default—will be transferred to them. These are, to pay the authority 5,000*l.*, the amount of Sir J. W. Bazalgette's award, with the legal expenses since incurred, the terms of repayment to be hereafter settled by an order from the Local Government Board.

ON Saturday, 14th inst., the tenth annual flower show and industrial exhibition of the parish of St. Philip's, Clerkenwell, was held in the garden of the Vicarage, Holford Square, Pentonville, on which occasion Her Royal Highness the Princess Louise was present and distributed the prizes. The competitors consisted mainly of women and children of the poorer order of the parishioners.

BOARDING-OUT.

THE obvious moral from the results of the investigations into the recent cases of abuse of children 'boarded-out' is that the local government bodies should afford to the children boarded-out within their own unions the same protection, as to visitation and school attendance, that is afforded under Mr. Goschen's Poor-law Order to children boarded-out beyond the union limits. That order has worked with the happiest effects, and the reports of the state and progress of the children who thus receive the blessings of home-life are most satisfactory.

THE SOCIAL SCIENCE CONGRESS.

THE following are the special questions connected with sanitary science selected for discussion in the Health Department at the forthcoming Aberdeen Congress:—1. What is the best mode of providing suitable accommodation for the labouring classes, and of utilising open spaces in towns? 2. How can the sanitary condition of the population engaged in the coast fisheries of Scotland and the United Kingdom be improved? 3. The present state of house accommodation in rural districts—can its evils be remedied?

THE ELECTRIC LIGHT.

It is now almost certain that the Great Exhibition of 1878 will be lighted by electricity. Before this year's *Salon* closed, several successful electric experiments were made in presence of the Minister of Fine Arts, and within the last few days these have been repeated. The interior of the Palais de l'Industrie has been lighted by two electric chandeliers. Every day these experiments have been repeated, in order to discover the best means of lighting the immense building. It has been calculated that at least 10,000 candles would have been necessary to give the same light as that given by the electric chandelier. The experiments apparently have been most satisfactory with the statuary, though, as regards the pictures, great doubts exist.

METROPOLITAN BOARD OF WORKS.

A NEW committee of fifteen members, to be called the Special Purposes and Sanitary Committee, has been appointed by this Board, to deal with the questions connected with the ventilation of sewers and the sale of gas, the Gas and Petroleum Act, Slaughter-houses, Explosives, and other Acts. The sanction of the Board has been given to the borrowing, by Kensington vestry, of 11,578*l.*, for defraying the cost of purchasing horses, carts, harness, shoots, and skips, at an annual rate of interest not exceeding 5 per cent., the principal to be repaid by instalments over five years. A 10,000*l.* loan was granted to Newington vestry, for granite paving works, on similar terms to the last, the principal to be repaid, with 3*l.* 15*s.* per cent. annual interest, within twenty years. Upon similar terms, but repayable in thirty years, a loan of 20,000*l.* was granted to the guardians of St. Olave's Union, for making additions and alterations to their infirmary at Rotherhithe.

DOMESTIC ECONOMY.

THE report of the educational officer of the Society of Arts, just issued, gives *inter alia*, the results of the recently-held examinations in domestic economy. The subject was introduced for examination for the first time last year. The examiners appointed for this year were Miss E. Shaw-Lefevre for 'Housekeeping and Thrift,' Miss Mary Wallis for 'Clothing and its Materials.' Dr. Ogle for 'Health,' and the National Training School for 'Cookery.' Though the number of candidates was small, it was larger than last year. The numbers last year and this year were as follows:—Clothing, 10–16; Cookery, 10–26; Health, 8–35; Housekeeping, 9–17. In Cookery all the candidates passed (15 first and 11 second class); in Health 26 failed, and only three passed in the first class; in Housekeeping eight failed, and six passed in the first class; in Clothing one failed, and nine passed in the first class. Among the successful candidates are several young men, five of them taking first-class honours in Cookery. The first prize in Cookery, with the added Council prize of ten guineas (for females) was carried off by Mary S. Mugeam, of the Birkbeck Literary and Scientific Institution. The questions set were of a most practical character, having reference in most cases to knowledge required for every day use or (as in Health) such as may be at any moment needed. It is to be hoped that next year this examination will be more widely known, and that there will be a larger number of candidates.

THE SCHOOL-BOARD PLAYGROUNDS.

AT the last weekly meeting of the London School Board, the Rev. J. Bardsley on resuming the debate on the Sunday question (see SANITARY RECORD, July 13), objected to the Sunday opening of playgrounds as being in opposition to religious teaching, while Mr. Mark Wilks urged that no theological considerations should be allowed to stand in the way of doing what was right and necessary. The question, he said, was what was necessary now, and not what was laid down by another people in the time of Moses. The amendment was opposed by Mr. Peek, who objected that the adoption of it would tend to perpetuate what was a great evil—the continued opening of public-houses on the Sunday; by Mr. Pierce, Dr. Angus, Canon Money, who urged that children as well as grown people required a day's rest a week, the Rev. Mr. Sinclair, and Mr. Lucraft. On the other hand, Mr. Buxton, Lord F. Hervey, and Mrs. Fenwick Miller supported the opening of the playgrounds, the last urging that the playgrounds were open spaces in overcrowded neighbourhoods, and that it would be a great relief to the homes of the poor to both parents and children—if the latter could pass out into the playgrounds. Those, she said, who opposed this proposition could have no knowledge of the wretched homes of the very poor or sympathy with their condition. Mr. Potter also opposed the proposal, and the Rev. John Rodgers having opposed the proposal on the ground that as the caretakers were at work all the week from early in the morning until late at night, it would be too much to expect them to work as well on Sunday, a vote was taken and the proposal was rejected, 10 voting for it and 28 against.

PUBLIC OFFICES.

THE report of the Select Committee appointed to inquire as to the propriety of concentrating the various public buildings in the metropolis is now issued. The Committee strongly urge the expediency of some such concentration, as they are of opinion that delay will lead to greater expense in the future. Three plans were submitted to the Committee. The first was that of Sir Henry Hunt, consulting surveyor to the office of works. He proposes to purchase all the block of buildings bounded by Parliament Street on the east, St. James's Park on the west, Great George Street on the south, and Charles Street on the north. This contains 133,000 superficial feet of building area, and the estimated cost of the ground amounts to 1,300,000*l*. On this block Sir Henry Hunt provides accommodation for the War Office, the Admiralty, and the Council Office; he proposes to remove the old buildings in Downing Street, and to erect houses fronting the park for the First Lord of the Treasury and the Chancellor of the Exchequer; to add a story to the Treasury Offices, to place the Board of Trade between them and the Horse Guards; to retain the Horse Guards; and to place the Office of Works and the Office of Woods between the Horse Guards and the present Admiralty, and thus to leave the existing Admiralty building at the disposal of the Government. Another plan was submitted by Mr. Mitford, suggesting that the public offices should be placed on the west side of Charing Cross; and the third plan, submitted by Mr. Cates, proposed acquisition of one side of Whitehall Place, and the houses in Whitehall Gardens up to Montagu House.

THE SUB-WEALDEN EXPLORATION.

MR. HENRY WILLET has issued his fifteenth and last report on the Sub-Wealden Exploration. For more than a year the work has been practically discontinued; and although the British Association at their meeting last autumn granted 100*l*., at the instance of Major Beaumont, the *Academy* believes that the bore-hole has not been carried a single foot deeper, nor has a new hole been commenced. In April of last year the famous bore had reached a depth of 1,905 feet, and that remains its depth at the present time. Still it must be conceded that the original object of the experiment has been attained, though the result is simply negative. The experiment has, in fact, shown most conclusively that palæozoic rocks do not exist at a depth of 1,900 feet beneath the Wealden area of Sussex. As the enterprise has thus come to an end, Mr. Willet, who projected this bold experiment of burrowing into the earth for purposes purely scientific, has resigned the honorary secretaryship, and has wound up the affair by issuing his final report. Possibly, however, a new boring in a new locality may be undertaken. Indeed, the extremely interesting results which Messrs. Meux's boring has yielded might well stimulate the committee to renewed exertions; in fact, the *Academy* already hears of several sugtions to this effect. Prof. Prestwich proposes that the experiment should be made near Folkestone, and in the Thames Valley; Mr. Godwin-Austen suggests Hythe and the North Downs; while Mr. Topley prefers Dungeness, Sevenoaks, and St. Margaret's Bay, east of Dover. To leave the problem in its present position, without attempting any further solution, would be, says Mr. Willet, 'an eternal disgrace to the science, to the wealth, and to the enterprise of England.'

POISONOUS DISINFECTANTS.

ONCE more the public papers announce an inquest in the case of a patient dying from the administration, by misadventure, of a poisonous disinfectant—carbolic acid. Dr. Hardwicke held an inquest at the St. Pancras Coroner's Court concerning the death of John Page, aged seventy-seven. The evidence showed that the deceased, an inmate of the infirm ward at St. Pancras Workhouse, on Thursday morning asked one of the helpers (Kate Connolly) to give him some house-medicine, upon which she went to a cupboard and took therefrom a bottle and poured out a glassful, which Page took and drank off at a draught. He immediately found that there had been a mistake, and that, instead of medicine, carbolic acid had been given him. Although everything was done for the deceased, he expired in five minutes. It was clearly shown that it was against the rules of the house for any one except the paid nurses to give any one medicines, and that the bottles were of a similar kind. The jury returned a verdict of 'Death from misadventure.' It is not very long since cases of a similar kind were reported from St. George's Hospital, and from one of the Metropolitan asylums. Carbolic acid has many deaths to answer for; and it seems probable that it might in many cases be advantageously replaced by some one or other of several innocuous disinfectants, such as the fluid terebene of Dr. Bond, of which Mr. Waddy lately wrote in our columns; or the new fluid, 'sanitas,' a solution of peroxide of hydrogen introduced to notice by Mr. Kingzett, which is likely to prove of great value; or the colourless and odourless powder known as Langston Jones's 'universal disinfecting powder,' which has been for some time in use, the *British Medical Journal* believes, at the Metropolitan asylums, and rather extensively by medical officers of health. The same journal hears, also, of a 'neutral solution of chloride of zinc,' which is likely to be a valuable disinfectant fluid.

THE WHITE LEAD MANUFACTURE.

THE white lead manufacture is, perhaps, the most deadly of all of our manufactures; it kills slowly but surely, producing paralysis and many other permanent evils. As it is necessary to use carbonic acid gas in the manufacture, there seemed to be no way to avoid the danger. At last, however, an invention has been discovered, which we hope will shortly come into universal use. In the melting of the blue lead at present the fumes are destructive; in the process of turning the blue into white fatal consequences often ensue. A Mr. Thompson, of Poplar, has discovered a method by which both processes can be rendered innocuous. The manner in which he gets the carbonic acid gas to the blue lead is so ingenious that a description may be interesting. He has

constructed an air-tight and gas-tight chamber with doors at each end, a line of rails running through the chamber, on which line of rails a carriage is to run. The carriage is to be loaded with the blue lead outside the chamber, the line of rails extending to some distance outside on either side, thereby relieving the hands from the necessity of entering the chamber and encountering the fumes of the noxious gases, which they must do more or less in the ordinary stacks or kilns. The carriage when loaded is run into the chamber, the doors are closed, and the carbonic acid gas, etc., are admitted through pipes into the lower part of the chamber, and being previously heated, rise and diffuse themselves more readily through the chamber. When the process is completed the poisonous gases are got rid of from the chamber by means of pipes leading therefrom, through water, into the reservoir for the gas, and atmospheric air is pumped in, the doors are opened, the carriage run out again at the opposite door to which it was run in, and unloaded, no ordinary hand being required to enter the chamber at all. The chamber is lined with glass, which appears to be impervious to the effects of the gases used. Altogether, Mr. Thompson's process seems to avoid the necessity of the hands employed in the manufacture of white lead encountering the poisonous gases almost entirely, their presence in the chamber where the gases exist being unnecessary at any time.

PUBLIC HEALTH METROPOLIS BILL.

THE opposition to this Bill by the local authorities of the metropolis has been very great, and has retarded its passage through the Committee of the whole House. Several documents have been printed which dwell on some important features of the Bill, amongst which we will notice those of the Council of the Medical Officers of Health and of the Medical Officers of Kensington and Hackney. The new clauses of the Bill only are referred to by the Council of Medical Officers of Health, except 49 to 54, which are based on Sections 4, 5, 6, 7, 8, 9, 11, 12, and 14, of the Diseases Prevention Act, and the 40th Section of the Sanitary Act, by which the Local Government Board would have power to make regulations whenever the metropolis appeared to be threatened, or was affected, 'by any formidable epidemic, endemic, or infectious disease.' The Council consider that the words 'cholera, plague, yellow fever, or some cognate disease' should be substituted for the preceding words, by which the clauses of the new Bill would be brought into unison with the practice hitherto pursued. We find the same in the Hackney circular, and consider the proposed alteration to be judicious. It also seems an important step towards removing the objections entertained by the local authorities, because as the clauses now stand the Local Government Board would have power to issue any orders they might deem necessary in direct opposition to the vestries, and in supersedence of the medical officers of health by other officers appointed to carry out the regulations.

The Council of Medical Officers of Health, in dealing with the new clauses for the provision of hospital accommodation, repeat their former conclusions that adequate provision for the isolation or treatment of infectious diseases does not exist in the metropolis; that it can be best made by a central authority acting for the whole metropolis; that such provision should be completely dissevered from any relation with pauperism; and that the gratuitous reception and treatment of any person in any of these hospitals should not constitute pauper relief. Drs. Dudfield and Tripe take similar views, and have done so for some time. These are important opinions, as they are in direct opposition to the preamble of the Local Government Board Act, 1871, which sets out that the Act was carried for the purpose of bringing the administration of poor law and sanitary work under one department of State. As regards the metropolis, in which so much is done by the Metropolitan Board of Works, the water and gas companies, and by the vestries and district boards under the Metropolis Local Management Acts, there is not so much necessity for the supervision of a central authority as in the extra metropolitan districts. It is therefore a matter well worthy of consideration whether or not a new Bill should be brought in providing for uniformity in carrying out house drainage, means of isolation, and the treatment of those who are suffering from infectious diseases, the prevention of overcrowding, systematic inspection of lodging-houses, and other sanitary matters, so that but little would be left as a subject of appeal to the central authority, unless the local authorities neglected to carry out these new laws. It would also be better that the local authorities should in all cases have the right of appeal to Her Majesty's High Court of Justice, and that costs should in all cases be paid by the losing parties, than that the prosecutor should be paid by the local authority, unless recouped by the defendant, as proposed in this Bill.

Special Reports.

WEST KENT SEWERAGE WORKS.

IN 1874 the Bromley Rural Sanitary Authority instructed Sir Joseph Bazalgette to prepare plans for the drainage of their district, which resulted in the necessary powers being obtained for the construction of the main intercepting sewer of the present undertaking. The Cray Valley Sewer Scheme of 1868, having since been sanctioned by Parliament, forms a branch to the main sewer which it joins at Bexley.

The West Kent Main Sewerage is entirely a gravitation scheme, and is designed for the accommodation of the parishes in the Bromley Union. The works consist of the main line of intercepting sewer, fifteen miles in length, and the branch, which is six miles and a half in length. Some portions of the main sewer will be in tunnel, and there—as also in deep cuttings—the sewer will be egg-shaped in section, 6 ft. high by 4 ft. wide internally, and 9 in. thick. It will be built with blocks of Portland cement concrete to a height of 4 ft.—that is, to the springing of the arched roof, which will be constructed of brickwork in cement. Where the sewer is carried through open cuttings, or in embankments, it will be circular in section, 5 ft. 6 in. in diameter, and 9 in. thick, and will be built in solid concrete. At one point in its course the sewer will pass under the River Cray, and there a piece of special construction occurs. The sewer is divided into two iron tubes on one side of the stream, each 4 ft. in diameter, set in concrete, and united again on the other side. The sewer will be carried under Dartford Creek by a syphon arrangement consisting of two iron tubes with penstock chambers at each end.

At Dartford Marshes, near the outfall, there will be a reservoir 500 ft. long and 120 ft. wide, which will be used for filtering the sewage prior to its being discharged into the River Thames at ebb tide and below low water. The reservoir will be constructed of concrete, and divided into several compartments, or bays, with the view of enabling the filtering operation to be carried on continuously.

The Cray Valley branch commences at Orpington by a pipe-sewer, which gradually increases in size until the diameter is 2 ft. 6 in. at its junction with the main sewer at Bexley. The levels throughout the main sewer are variable, the flattest fall being 3 ft. in a mile. On the Cray Valley branch the levels are also variable, and generally speaking, steep, the flattest fall there being 1 in 1,000. The works of the main sewer were commenced about four months since at a point in the route called Halfway Street, near Sidcup, and they are being vigorously prosecuted over a length of two miles.

Considering the adverse nature of the weather since the works were started, very good progress has been made by the contractors, Messrs. John Neave and Son, the work

done being of good quality. At the present time eight shafts have been sunk down to the level of the sewer at a depth of from 40 ft. to 50 ft. from the surface, and three other shafts are being sunk and will shortly reach the sewer level. About 800 ft. of sewer in the tunnel have been executed, and a further length of about 1,650 ft. has been constructed eastward of Penhill Bridge in open cutting. It is anticipated that the works will be completed out of hand in a little more than two years from the present time. The concrete in the sewer in tunnel is in the form of blocks, which are moulded at surface and set in cement. By adopting the concrete system of construction a considerable saving is effected in the cost of the works.

PUBLIC WORKS IN SALFORD.

ON June 27 the members of the Manchester Scientific and Mechanics' Society visited some of the works of the Salford Corporation now in progress of execution. The members first proceeded to Sussex Street for the purpose of inspecting the intercepting sewer in course of construction there. They were accompanied by Mr. Fowler, the Salford borough engineer, who described the works. The works in course of construction in Sussex Street form part of the intercepting sewer which extends from the west end of Sussex Street to the north end of Montague Street, including the iron culvert underneath the river at the latter point. The intercepting sewer is already constructed through the town for a distance of 3¾ miles, and for the greater part of its length is from 30 ft. to 40 ft. in depth below the surface, and the size of the sewer is as the outlet 8 ft. 6 in. diameter, and at this part it is 5 ft. diameter. There are forty-nine sewers now discharging into the River Irwell. The main sewer up to this point will admit of thirty-nine of these being intercepted, and the contents discharged at Mode Wheel, where extensive works are now in course of being designed for dealing with the sewage. The cost of the main trunk sewer when completed will be about 72,000*l.*, and will admit of draining every portion of the borough to one outlet about a mile below the town. The special features in the scheme are the facilities obtained for passing off the flood waters from the low lands of the borough, as in Lower Broughton, Ordsall, and Greengate, and the provision made for passing off storm-water (by means of self-acting weirs) direct into the river instead of through the main sewer. Special means have been adopted in crossing under the river by flattening the upper surface of the pipes; and, by shortening the line as much as possible so as to obtain the necessary fall, difficulties have been overcome in carrying out the work, as a great deal of private property and buildings have been passed under—including two crossings under the river, the canal, and a large area covered by railways. The portion in Sussex Street varies in depth from 20 ft. to 22 ft. below the surface. A great portion of the ground is artificially formed, the bottom portion being composed of quicksand and gravel. A cast-iron culvert, in course of construction under the bed of the river, is being laid by means of coffer-dams, one-half being laid at one time. At this point an outlet will be obtained for the drainage of the whole of the land situate between the canal and the river at a depth of 15 ft. below the surface of the ground, and will be continued along the valley to suit the new roads now in course of construction by the corporation.

The members were then taken to the mouth of Salford main sewer in Mode Wheel Lane. Here an opening was pointed out by Mr. Fowler, who explained that it is intended to fix in it the necessary pumps to raise the sewage in the tank for deodorisation before it is passed into the river. In the brook is one of the leaping weirs before mentioned for passing off flood waters. There are thirty-six acres of land purchased for this purpose, and the road in course of construction is intended to form the approach to the proposed works.

NORTHERN COUNTIES ASSOCIATION OF MEDICAL OFFICERS OF HEALTH.

THE annual meeting of the Association was held at the Hotel, Chollerford, Northumberland, July 5, J. M. Maclagan, M.D., president, in the chair. The first portion of the meeting was devoted to the following formal business:

1. Consideration and adoption of the report of the committee. The report showed that the association consists of forty-four individuals, of whom thirty are members, and fourteen are associates. Among the transactions of the year are recorded the presentation to Parliament of the petition of the association, praying for permanence and security of tenure of office by medical officers of health, to which a favourable reply had been received. The following is an extract from the report:—'In answer to the application of the Association to the University of Durham to grant degrees in sanitary science, which was reported at last annual meeting as then being under the consideration of the Senate of the University, your committee has to report that in April last notice was received from the registrar of the University of Durham that at a meeting of the Senate on March 20, it was resolved—

'(1) That a lectureship in Public Health be established in the University of Durham College of Medicine at Newcastle-upon-Tyne.

'(2) That Mr. Henry E. Armstrong be appointed lecturer.

'(3) That the course of lectures should comprise physics and chemistry applied to public health, sanitary legislation, meteorology, climatology, and the geographical distribution of disease in the United Kingdom, sanitary science, and practical hygiene.

'(4) That a certificate be given, termed "Certificate of Proficiency in Sanitary Science, granted by the University of Durham.

'A draft scheme, prepared by the Council of the College of Medicine, was also agreed to by the Senate.

'Your committee, whilst acknowledging the consideration that has been given by the University to the application of the Association, and fully appreciating the advantages likely to result from the establishment of means of education in sanitary science, regrets exceedingly that neither to the receiver of such theoretical instruction in this department, nor to the possesssor of such knowledge as is only to be gained by practical experience in sanitary work, is opportunity afforded for obtaining a more substantial proof of proficiency than a mere certificate. Your committee trusts, however, that at no distant date, the University may again consider the subject, and by granting degrees in sanitary science, avail itself of its power of promoting the national welfare in the stimulus it will thus give to the study of those conditions which affect the public health.'

The following were appointed officers for the ensuing year: President-elect, J. M. Fox, M.R.C.S.; Vice Presidents, R. Elliot, M.D., D. Jackson, M.D., H. J. Yeld, M.D., Jno. Spear, M.R.C.S.; Honorary Secretary, Henry E. Armstrong, M.R.C.S.; Committee, J. C. Reid, M.D., A. E. H. Trotter, M.R.C.S., H. D. Ward, M.D., J. Mackie, L.R.C.S., William Clarkson, L.R.C.P., R. C. Pritchard, L.R.C.P.

The autumn meeting was fixed to be held at Cockermouth.

On the motion of Dr. Maclagan, seconded by Mr. Armstrong, it was resolved, That in Rule 2 the words 'Debates and' be prefixed to line two, so as to read, 'The objects of the Association shall be debates and the reading and discussion of papers on subjects relating to State Medicine, etc., etc.'

At the general portion of the meeting, the president delivered an inaugural address, after which Mr. Spear read a paper on 'The Influence of a Filth Polluted Soil on the Health of Towns.' Mr. Spear also gave notes on a case of so-called 'Pig Typhoid,' and exhibited the small intestines of the animal. The proceedings of the meeting were then brought to a close.

A CITY FLOWER SHOW.

ON the 10th inst., for the eighth year in succession, an exhibition of window plants and flowers grown within the City was held in the small but pretty gardens of Finsbury Circus. The show was supported by the Civic authorities, and was enhanced in interest by the consent of the Duchess of Westminster to distribute the modest prizes offered by the committee. The churchyard of Bishopsgate has been within a few years relieved of its gloomy surroundings and transformed into the prettiest garden within the City walls. To the rector, the Rev. William Rogers, and his curate, the Rev. Francis Bishop, this City flower show owes its origin and its annual success, while the Aldermen and the other authorities of the Ward have cordially supported it. Some hundreds of pretty specimens were exhibited, and the prizes were divided into thirty classes of three prizes each, the majority being open to all except *bonâ fide* gardeners, some others being allotted to firemen and policemen, and the few remaining to professional gardeners. Special prizes were also given by the Royal Horticultural Society, by Mrs. Smee, the widow of the late eminent surgeon and botanist, by Messrs. Radclyffe and Co., and by the proprietors and editor of the *Gardener's Magazine*. The judges were Mr. Richard Dean and Mr. A. F. Barron. The flowers and plants exhibited included geraniums, fuchsias, musk, creeping jenny, ferns, evergreens, ivy, and myrtle. Many of the winners were little girls and boys, whose delight at the success of their pet flower was quite pleasing to witness. The show was opened by the committee about noon, and throughout the afternoon the excellent band of the City Police Force played at intervals. The Duchess having distributed the prizes, Mr. Rogers proposed in appropriate terms a vote of thanks to her Grace, specially alluding to her efforts and those of her husband to improve the condition of the humbler classes in the great city, in which they were so largely interested. The Duke of Westminster, in reply, expressed the great pleasure it had afforded the Duchess and himself to attend so interesting an exhibition. It was, he said, only within the last few years that it had been possible to grow and rear plants and flowers in the city, owing to the smoky and impure condition of the atmosphere; but he hoped the time was not far distant when not only the pretty specimens they had seen, but even roses might be grown. He rejoiced that such shows were held, for he felt convinced that the very sight of the choice natural gifts which God had bestowed must have an influence for good on the hearts and homes of the people and on the happiness of the family. He expressed, in conclusion, a hope that the old and disused burial-grounds of the city might be utilised, where practicable, as flower gardens, and that the squares and enclosures of London might be made more generally available for innocent recreation.

CHILDREN'S FLOWER SHOWS.

BY the permission of the Duke of Argyll, a flower show for children, which presented many features of novelty and interest, was held on the 11th inst. in the beautiful grounds of Argyll Lodge, Campden Hill. Her Royal Highness the Princess Louise (Marchioness of Lorne) kindly came down in the evening and distributed the prizes to the successful children. Mr. E. R. Creed, of the Mission Hall, Edge Street, acted as superintendent, and Mr. J. F. Maitland as treasurer. The performances of a juvenile band added to the liveliness of the proceedings. A similarly interesting gathering also took place in the gardens of Grosvenor House, where there was a show of flowers by the children of the schools of St. George's, Hanover Square, St. Mark's, Hanover, Curzon, and Grosvenor Schools. Her Grace the Duchess of Westminster distributed the prizes, and addresses were delivered by the Duke of Westminster, the Earl of Shaftesbury, and the Rev. Capel Cure.

TRAINED NURSES.

ON the 10th inst. a meeting of gentlemen and ladies interested in the establishment of a district nursing home for the benefit of the poor in Lambeth and its neighbourhood, in connection with the Metropolitan and National Nursing Association, was held, by permission of the Archbishop of Canterbury, in the library of Lambeth Palace. The chair was taken by Mr. Robert Wigram, and afterwards by his Grace. Captain Edward F. K. Fortescue, secretary to the parent society, explained its aims and operations, dwelling upon the great importance of having the sick poor tended by skilled nurses. The association, he said, looked forward to the establishment, in the first instance, of one district nursing home for Central, East, and South London respectively. The central home had been fixed in Bloomsbury-square, a year or two ago, under Miss Lees, who estimated that to maintain a home for Lambeth would require about 700*l.* a year. Formal resolutions were moved by the rural Dean, rector of Lambeth, the Rev. J. F. Lingham, M.A., and by Dr. Shrimpton, in favour of the foundation of a District Nursing Home in Lambeth, and by Mr. Andrew Johnstone and the Rev. J. G. Tipper, M.A., of St. Mary's, Lambeth, for the appointment of a local committee to aid in raising funds for the support of the proposed home, and to interest persons in the neighbourhood in the work of the Association.

ACCOMMODATION TO HOP-PICKERS.

AT a meeting of the Farnham local board at the Town-hall, on the 11th inst., Mr. Wonnacott called the attention of the board respecting the accommodation afforded to hop-pickers. Unlike the majority of the members he was not a hop-planter, but his observation and experience had convinced him that the time had arrived for the decent housing of the pickers. That the accommodation hitherto provided was disgraceful to a Christian country was shown by the report of their late surveyor. He moved 'That the by-laws of the Local Government Board relating to the accommodation for hop-pickers be adopted by this board.' The regulations were then read by the Clerk. They provided for the separation of the sexes, for cooking arrangements, water-supply, and general sanitary provision. The motion was not seconded, and it consequently fell to the ground. Mr. Wonnacott gave notice that at the next meeting he should move 'That statistics be that year obtained of the general accommodation provided for the hop-pickers in Farnham, and that the same be presented to the board after the hop-picking season.'

SALE OF FOOD AND DRUGS ACT.

AT the usual fortnightly meeting of the vestry of St. Martin-in-the-Fields last week, the quarterly report of the public analyst of the parish, Professor Alfred Anderson, under the Sale of Food and Drugs Act, was read and adopted. It showed that samples of flour, bread, milk, arrowroot, pepper, etc., which had been analysed during the past quarter, proved that the standard of purity within the district was good. The analyst also reported that the analysis of the water of the Duncannon Street pump, undertaken by him at the order of the vestry, rendered it certain that the water in question was not fit for domestic use. The vestry had, in consequence, at once ordered the pump to be closed to the public. The term of office of the analyst, under the usual arrangement made with him by the vestry, having expired, the resolution for his re-election was put to the meeting and carried *nem. con.*

Medical Officers' Reports.

CAMBRIDGESHIRE COMBINED SANITARY DISTRICTS. The districts combined under the officer of healthship of Dr. Armistead comprise, 1. Saffron Walden, rural; 2.

Saffron Walden, urban; 3. Newmarket, rural; 4. Newmarket, urban; 5. Dunmow; 6. Linton; and 7. Risbridge. In making his second annual report, Dr. Armistead has followed in the general lines of his 1874 report. Both these reports are folio, and we think all officers of health would do well to adopt this, the official size, for their reports. Dr. Armistead's method of arrangement is a peculiarly happy one. First the area in acres of each district is given, then the number of inhabited houses, the population in 1871, male and female, together with the proportion per cent. of the population at various ages, viz., under 1 year, under 5 years, between 1 and 15 years, between 15 and 60 years, and above 60 years. Next comes a tabular statement of mortality within the district and analyses of these mortalities. Afterwards particulars as to sanitary work executed, epidemics, and general routine work.

Now the Local Government Board has issued definite forms for annual vital statistics, of course all officers of health must adopt them. Had not the Local Government Board decided upon this much needed step, we know of no reports so worthy of general adoption as Dr. Armistead's. One great value attaching to a medical officer of health's report is facility for comparative and referential purposes. Were all reports made on one general plan, and according to a recognised order as to subject, permanent instead of transient interest and value would be the result. Desultoriness is too much the order of the day with regard to health reports. Order is no enemy to originality, but it is of prime importance in all national statistical work.

Coming to details, we find that Dr. Armistead finds that section 62 of the Public Health Act requires amending before rural districts can hope to be supplied with wholesome water. This has been the experience of every rural sanitary authority in the country, and in all probability will be one of the first amendments the Government will introduce when next they become sanitarily inclined. Rather curiously Dr. Armistead appears to recognise two varieties of typhoid fever—a contagious and a non-contagious. He also seems to admit that typhoid fever is a specific filth product, as well as a travelling disease, or rather a disease that can be conveyed about.

Saffron Walden shows an 'excessive mortality from lung disease district,' but Dr. Armistead is not able to explain why such should be the case. In 1875 this rate was as high as 6·4 per 1,000.

Dr. Armistead seems to be successfully carrying out a thorough sanitary survey in all his district. Many sanitary authorities have set their face against such a survey mainly on account of the opposition likely to be excited. However, Dr. Armistead has satisfactorily proved that, with a little exercise of common sense the inspectors making such survey will be welcomed and assisted rather than hindered. The value of a house to house survey cannot be over-estimated. There are many other points of interest in these reports which cannot be here noticed. We can already detect the influence of Dr. Armistead's reports in those of some of his brother officers, and again report our conviction that to be of permanent and national value all reports should be national in plan and uniform in order of details.

OXFORDSHIRE COMBINED DISTRICTS.—Dr. Gilbert Child's reports are always interesting, especially as regards 'general observations.' All will remember that Dr. Child does not attach much value to conclusions based on our ordinary death certificates. He again repeats his former opinions and still thinks 'that the certificates of death as we now have them do not and cannot afford satisfactory ground for any scientific conclusions whatsoever, and further, that to use them for any such purpose is to misapply them.' Dr. Child holds that their true value is social rather than scientific—'They show that in the opinion of a skilled and impartial person who has been in a position to judge, the deceased has died by fair means.' Coroners' courts come in also for severe but fair condemnation, and it is to hoped that the time is not far distant when coroner's quest law will be thoroughly reformed. With Dr. Child we believe that in the majority of cases coroner's inquests discover nothing, and in other cases they often assist grievous miscarriages of justice. The examples given of death-certificates are highly interesting, and we should very much like to hear the opinion of Mr. Haviland on this formidable indictment on the geography of disease. The opinion, on the other hand, of Dr. Child on Mr. Haviland's conjunction of heart-disease and dropsy for geographical purposes would be equally valuable.

It may appear at first sight strange to introduce Mr. Haviland's favourite subject in a review of Dr. Child's annual report on the health of Oxfordshire, but the two medical officers are, as it were, two champions of opposite camps.

Dr. Child is also confirmed in the opinion that under existing law our sanitary administration has failed, and probably will always fail, to obtain for the people of this country the three primary requirements of healthy existence, viz., good water-supply, good drainage, and wholesome houses, and that it has failed to put any appreciable check upon the spread of epidemic disease.

Parliamentary Proceedings.

HOUSE OF LORDS.

(*Tuesday, July* 10.)

FETTER LANE IMPROVEMENTS.

IN answer to the Earl of Shaftesbury,

Earl Beauchamp stated that the accounts which had appeared in the newspapers of the eviction of the tenants of certain buildings in Fetter Lane were somewhat exaggerated. The buildings had been reported by the Sanitary Committee of the Commissioners of Sewers to be in a disgraceful condition, and the proprietor had given his tenants the usual three months' notice to quit in order that the necessary improvements might be carried out. At the end of that time, however, the tenants persistently refused to leave, and the proprietor was obliged to call in the assistance of the police to obtain possession. Whether the evicted people had been unable to obtain other quarters he (Earl Beauchamp) was unable to say; but they were certainly reminded more than once that they would be obliged to remove at the expiration of the legal term of notice. Of course, when large blocks of buildings had to be pulled down, it was impossible that some cases of hardship should not occur, but he was sure their lordships would agree that it was undesirable to extend indiscriminate sympathy to people who had deliberately set themselves to defy the law.

HOUSE OF COMMONS.

(*Tuesday, July* 10.)

THE East Worcester Water Bill was read a third time and passed.

The Edinburgh Street Tramways Bill was withdrawn.

(*Saturday, July* 14.)

CHRIST'S HOSPITAL.

MR. CROSS stated that, with the concurrence of the authorities of Christ's Hospital, he had appointed a committee to inquire, not only into the causes of the death of the boy Gibbs, but into the state and discipline of the school, consisting of Mr. Walpole, Mr. Forster, Mr. R. Gurney, Mr. Walter, and the Dean of Christ Church.

(*Monday, July* 16.)

SMALL-POX.

MR. SCLATER-BOOTH replying to Dr. Lush, said that according to the latest information there were in the metro-

politan hospitals 621 small-pox patients, as compared with 950 during the months of May and June. The statement, therefore, was comparatively satisfactory. Most of the vestries had provided extraordinary accommodation for the treatment of patients, and some of them were engaged in a house-to-house visitation to see that the people were properly vaccinated. Care would be taken that the experience of the last nine months should be properly collected.

IMPURE WATER.

MR. SCLATER-BOOTH stated, in answer to Colonel North, that his attention had been called to the report of Dr. Frankland upon the water supplied by the Southwark and Vauxhall Company, in which it was stated that that water was 'full of moving organisms, and contains an excessive proportion of organic impurity.' Complaints had frequently been made as to the condition of the water-supply of this company, which had been for some time in an unsatisfactory condition. The department had been in communication with the company on the subject, and he (Mr. Sclater-Booth) had ordered a statutory inquiry to be made. It was only just to the company to state that during the past year they had been incurring a great amount of expense in improving their filtration works, and it remained to be seen what effect this would have on the quality of the water.

Law Reports.

SUMMONS BY MILK RETAILER AGAINST VENDOR.

H. CARR, farmer, of Old Church Farm, Tottenham, appeared in answer to a summons charging him with having sold milk adulterated with water. The defendant pleaded 'Guilty.' Mr. Ricketts, for the prosecution, said the summons had been taken out by the Metropolitan Dairymen's Protection Society. The defendant supplied milk to J. Dudman, a retailer, who had a sample taken out, sealed up, and sent for analysis. The result was the discovery that the milk was adulterated with 11 per cent. of water. Mr. Peckham, for the defendant, said that the farm servants were responsible, as the defendant, who owned 100 cows, was unable to look after everything. Mr. Barstow said that the defendant was liable, and he required him to pay a fine of 10*l.* and 5*l.* costs. The money was paid.

REFUSING TO SELL MILK.

AT Marylebone Police-court, W. Hopkins, a milk-seller, was summoned for refusing to sell some milk to one of the inspectors. The inspector saw the defendant selling milk. He went up to him and asked him for a quart out of a can from which a customer had just been supplied. The defendant said that he could not let him have any out of that can, but he could have some out of another can he had on a barrow. The inspector said that he must have some out of the can he had first pointed out. The defendant said that he had not enough in it. The inspector thereupon opened the lid and saw that it contained about three pints, and he told the defendant that he would take as much as he liked to supply him with. He however refused to let the inspector have any. The inspector told him who he was, and that he would be summoned. These proceedings were taken out under the 17th Section of the Food and Drugs Act. Mr. Mansfield thought that the summons must fail, as the milk had not been exposed for sale in a shop or stores. Mr. Hortin observed that he relied on the section as far as the comma at 'sale,' and contended that the other part of the section referred to a different matter altogether. If this prosecution should fail the Act would be comparatively a dead letter. The question was, no doubt, arguable. The case was adjourned that the matter might be looked into. Mr. Mansfield now observed that there was a great deal of ambiguity about the section, but there must be a conviction. The defendant would have to pay a fine of 20*s.* and the costs.

BRIEF NOTES OF CASES.

ADULTERATION OF FOOD.

1877. *Wibb* v. *Knight.*—'Sale of Food Act, 1875,' § 6. Gin adulterated with 43 per cent. of water. Custom of the trade to adulterate gin set up as a defence. Conviction affirmed. (41 J. P., 388.)

BUILDINGS LINE.

1877. *Inglis* v. *St. Giles, Camberwell, Vestry.*—Building line duly prescribed. Order by magistrate authorising board to demolish the encroachment. Subsequent re-erection of the encroachment by the present plaintiff, and an application by him for an injunction to restrain the board from again interfering. Application refused. (*Times*, April 17, 1877.)

GAS COMPANY POWERS.

1877. *Reg.* v. *Colne Valley Gas Co.*—Indictment for obstructing highway by making trenches. Verdict 'Guilty.' Rule absolute for a new trial on the ground that the judge had misdirected the jury as to the effect of *Reg.* v. *Longton Gas Co.* (*Times*, May 19, 1877.)

GUARDIANS.

1877. *Luckraft* v. *Pridham.* Local Poor Law Act.—The 'Mortmain Act' has a general application, and guardians of the poor are incapable of taking officially the benefit of a gift by will of land. (W. N., 1877, p. 107.)

Legal Notes and Queries.

HOSPITALS AND PAUPERS.

Can a pauper suffering from an infectious disease be removed from an urban sanitary district (having a proper sanatorium of its own) into a union sanatorium? X. P.

[This question, as we understand, is 'Does a pauper cease to possess legal claims on the Poor Law Authorities when he becomes a sufferer from an infectious disease?' to which the answer must be, No. If needing Poor Law assistance he may be removed to the workhouse when infected as he might be when not infected.]

NUISANCE FROM SMOKE.

SIR,—In your number for June 29, you report a conviction of 20*s.*, obtained against Messrs. Wright and Co., for allowing 'dense volumes of smoke to be emitted from their shaft,' contrary to the Smoke Nuisance Act. Will you kindly say in your next issue if the Smoke Nuisance Act can be put in force in any town, or is it only applicable to the Metropolis? And if it is an Act which any town may adopt which has not already adopted it?

[The Smoke Act, specially so called, is only a Metropolitan Act, but the 'Public Health Act, 1875,' contains (§ 91) sufficient provisions for dealing with nuisances arising from failure to consume black smoke. See also the Railways Clauses Act.]

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

ANIMAL VACCINATION.

(*To the Editor of the* SANITARY RECORD.)

SIR,—In the *Times* of the 5th inst. you will observe a leader on the subject of Vaccination, called forth by the debate on Lord Percy's motion for an inquiry into the

system as at present practised in England, and in which animal or calf vaccination is denounced in most unjustifiable and sweeping terms, to wit: 'According to Dr. Seaton's investigations, calf vaccination is far less certain than vaccination from the human subject, and the uncertainty is shown not only in its occasionally failing entirely, which would involve no greater evil than delay and a repetition of the operation, but also in a frequent failure of a large proportion of the punctures, so that out of four punctures only one, or, perhaps only two, will be successful. It must be true now as it was true in 1869, that the human infant is less ready to assimilate virus taken from the calf than virus which has been previously passed through a human subject; and hence the uncertainty of operation, for which animal vaccination has been condemned as regards the public service, must be an abiding and not merely a temporary objection to its employment. For individual cases, without any doubt, it answers perfectly; but it will not bear to be tested by the average results of a large number of operations. In the countries in which it is most trusted, and even in Belgium, where alone it is recognised and assisted by the state, it is practised upon a very insignificant scale; and not a tittle of evidence has been brought forward in any country to rescue it from the reproach of uncertainty which was brought against it by Dr. Seaton eight years ago, etc.'

I have appealed to that journal for a fair hearing of the contrary statements, but they have refused to give publicity to what I conceive to be if not a refutation, a statement which deserves publicity equal to the indictment it contravenes; so that in view of prosecuting an impartial inquiry and thorough sifting of the question I beg the SANITARY RECORD to place side by side with the unqualified assertions of the *Times* to the discredit of animal vaccination, the equally unqualified assertion of the direct contradiction by the Belgian Government officer presiding over the State Vaccination Department. I suppose that the *Times* is actuated by the worthy motive of fearing lest, by admitting argument as to the perfection of the system at present in vogue in England, it should seem to countenance agitation against the invaluable process of vaccination altogether. I am persuaded myself to the full as profoundly and sincerely as the *Times* of the value of vaccination as a protection against small-pox; but what I desire to plead for and to urge the SANITARY RECORD to allow me to press on the public attention is the question whether the calf system does not furnish an equally, if not still more effective safeguard against this scourge, precluding at the same time the possibility of all reasonable objections on account of generally admitted possibilities of resultant evil. You will therefore kindly give publicity to a few of the facts contained in a previous letter of mine on the subject of animal vaccination, directly contradicting the statements made in the *Times*.

'With regard to the efficacy, Dr. Warlomont asserts, in opposition to the view maintained in the recent article in the *Times* that even fresh animal vaccine is much less certain than human vaccine, that in vaccinations immediately from the calf by "vaccin vivant," as he calls it, success, where the operator is duly skilful and careful, is absolutely invariable, whilst the results from vaccine preserved on ivory points are, according to official report to the Royal Medical Academy of Belgium for the year 1870-71 for vaccinations, 96 per cent. successful, in revaccinations 62 per cent., thus presenting a marked superiority over those obtained in England by human vaccine, where the average of success is 90 per cent. in the vaccinations from tubes, and 96 per cent. by ivory points. With regard to the preservative efficacy of animal vaccine, Dr. Warlomont asserts that of 10,000 infants vaccinated at Brussels between 1865 and 1870, not one was attacked during the terrible outbreak of small-pox in 1870-71, by that malady, and that the same immunity was enjoyed by the adults revaccinated. Finally, Dr. Warlomont remarks that it is a question meriting serious exhaustive examination, whether mothers are not justified in objecting to allowing the vaccine pustule of their infants to be exhausted of lymph, in case the immunity from small-pox, which is the end in view, is to be secured. For myself, I feel strongly persuaded of the desirability of adopting the system of vaccination by animal lymph, but I have purposely abstained from propounding any personal views on the subject, my object being to render as widely known as possible in England, the opinion of a scientist on the subject, of European celebrity, and unimpeachable competence.'

Either what Dr. Warlomont asserts is true or not true. If it be true, the assertions in the *Times* are incorrect; if it is not true, his statements, the statements, be it remembered, of an official in high position under the Belgian Government, a *savant* well known to European scientists, can and ought to be confuted.

Alton, Hants, July 14, 1877. THOMAS WILSON.

PATENT SANITATION.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Permit me to make two or three observations on Mr. Buchan's letter in last week's SANITARY RECORD. Mr. Buchan rashly asserts that the illustration, fig. 2, in my letter of the 6th inst., shows an 'inferior modification' of one of his 'patent ventilating traps,' and that it is a 'new idea' of mine. I beg to assure him that he is quite mistaken in this. The 'modification' is vastly superior to his arrangement, and it is no 'new idea' of mine at all, for I, and others to my knowledge, have used a ventilating trap with a vertical drop, like that shown in fig. 2, for years before he obtained a patent for the same kind of trap; and, so far as I am concerned, I shall continue to use it, notwithstanding his threat to have me 'pulled up,' as he elegantly phrases it, if I do so. Mr. Buchan also rashly asserts that he has 'examined *all* the documentary and other evidence that bore upon the case.' This I know he has not done, for I have evidence on the subject which he has not seen, and is entirely ignorant of, and I and others could point, if necessary, to where he may see much more of it. Mr. Buchan says, 'I beg to express my gratification at reading the able exposition which Mr. Phillips gives of the working of *my system*.' 'My system,' as he calls it, has been practised to my knowledge for fifty years past. Mr. Buchan reminds me of the Scottish motto, that 'Nobody provokes him with impunity.' He should remember the fate of the frog in the fable.

Putney, Surrey, July 14, 1877. JOHN PHILLIPS.

Sanitary Invention.

VIN DE BAUDON.

THIS medicated wine is a preparation of phosphates combined with a basis of sound wine. It has been extensively and successfully used in the Paris hospitals as a tonic and restorative in cases of phthisis, strumous disease, and in the convalescent states after severe surgical operations, etc. Dr. Andrew Clark gave it a trial in the London Hospital in a very severe case of empyema, in which he twice performed aspiration, in October, 1876. From the extremely feeble condition of the patient, death from exhaustion was feared after the operation, and Vin de Baudon was tried instead of brandy, which had previously been given, in conjunction with a liberal diet. After this treatment had been persevered in for a month, marked signs of improvement were visible, and the patient ultimately recovered.

ANSWERS TO CORRESPONDENTS.

DR. LONGSTAFF.—Chambers' 'Public Health and Local Government' (Knight and Son); Hart's 'Manual of Public Health' (Smith, Elder, and Co.)

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

BLACKFORD, John Cromwell, M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the Cannock Urban Sanitary District.

BROADBENT, James, Esq., has been appointed Treasurer of the Cannock Local Board and Urban Sanitary Authority.

BULLOCK, Mr. J., has been reappointed Surveyor and Inspector of Nuisances to the Shardlow Rural Sanitary Authority at 22*5l.* for one year.

DRING, William Ernest, L.R.C.P. Edin., M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for No. 3 Sub-District of the Faversham Rural Sanitary District, vice Francis, resigned.

GLOVER, Mr. John, has been appointed Clerk to the Cannock Local Board and Urban Sanitary Authority.

HANHAM, Mr. Alban, has been appointed Collector to the Briton Ferry Local Board and Urban Sanitary Authority, Glamorganshire, vice Morgan.

HASLAM, Mr. Charles, has been appointed Inspector of Nuisances for the Ilkeston Urban Sanitary District, Derbyshire.

HAWKER, Mr. Wm. Sloggett, has been appointed Clerk to the Camelford Guardians and Rural Sanitary Authority, vice Mr. C. C. Hawker, deceased.

JONES, Mr. Henry, has been appointed Town Clerk of Colchester, Solicitor to the Corporation, Clerk to the Sanitary Authority, and Clerk to the School Attendance Committee, 550*l.* per ann.

MASSEY, William, L.R.C.P. Edin., M.R.C.S. Eng., has been reappointed Medical Officer of Health for the Shardlow Rural Sanitary District, at 100*l.* for one year.

PEAKE, Mr. John, has been appointed Surveyor and Inspector of Nuisances to the Cannock Local Board and Urban Sanitary Authority.

PRICE, Mr. J. D., has been appointed Inspector of Nuisances for the Worcester Rural Sanitary District, vice Young, resigned.

SMITH, Mr. Thomas, has been appointed Collector to the Cannock Local Board and Urban Sanitary Authority.

SPEAKMAN, Mr. Charles E., has been appointed Clerk to the Nantwich Guardians and Rural Sanitary Authority, vice Pick, resigned.

WILLIAMSON, John, Esq., has been appointed Vice-Chairman of the Cannock Local Board and Urban Sanitary Authority.

WOOD, William Dyson, L.R.C.P. Edin., L.R.C.S. Edin., has been reappointed Medical Officer of Health for the Wakefield Rural Sanitary District for three years.

VACANCIES.

ALTOFTS LOCAL BOARD AND URBAN SANITARY AUTHORITY, Yorkshire, Clerk.

ASHFORD LOCAL BOARD AND URBAN SANITARY AUTHORITY, Kent. Surveyor and Inspector of Nuisances. Application, 28th July, to F. Hughes Hallett, Clerk.

FARINGDON RURAL SANITARY DISTRICT, Berks. Medical Officer of Health for the Shrivenham Sub-District. Application, 31st instant, to George J. Haines, Clerk to the Authority.

FENTON LOCAL BOARD AND URBAN SANITARY AUTHORITY, Staffordshire. Collector and Sub-Sanitary Inspector: 100*l.* per ann. Application, 30th instant, to Charles Adderley, Clerk to the Authority.

HANDSWORTH LOCAL BOARD AND URBAN SANITARY AUTHORITY, Staffordshire. Surveyor: 300*l.* per ann. Application, August 13, to Henry Ward, Clerk, Church Street, West Bromwich.

METROPOLITAN BOARD OF WORKS. Inspector of Slaughter-houses, etc.: 150*l.* per ann. Application, 26th instant, to J. E. Wakefield, Clerk to the Board.

RADNORSHIRE. Public Analyst: 21*s.* per analysis and travelling expenses when attending to give evidence. Application to the Clerk of the Peace, Presteign.

STOWMARKET LOCAL BOARD AND URBAN SANITARY AUTHORITY, Suffolk. Inspector of Nuisances.

EDUCATION IN STATE MEDICINE.

UNIVERSITY OF DURHAM.

THE Warden and Senate of the University of Durham, actuated by the consideration, that recent legislation has created a demand for medical officers of health, *i.e.*, members of the medical profession, who, in addition to other professional qualifications, are required to possess a knowledge of Preventive Medicine, have approved of the foundation of a Lectureship on Public Health in the University of Durham College of Medicine, at Newcastle-upon-Tyne.

EXAMINATIONS IN STATE MEDICINE.

The Warden and Senate of the University of Durham, in recognition of the importance, that Medical Officers of Health, or those seeking appointments as such, should possess a proof of their special acquirements, have instituted Examinations in State Medicine, by which the successful Candidates will be entitled to receive a Certificate of Proficiency of Sanitary Science.

REGULATIONS.

A.—For the Certificate of Proficiency in Sanitary Science:

1. That the Candidate shall be a registered Medical Practitioner.
2. That the Candidate shall have attended one Course of Lectures on Public Health, at the University of Durham College of Medicine, Newcastle-upon Tyne, extended over one Winter Session.
3. That the Candidate shall be required to pass an Examination on the following subjects:

(α.) PHYSICS—Laws of Light, Heat, Hydro-dynamics, and Pneumatics.

(β.) CHEMISTRY.—As applied to the detection of Noxious Gases, and Atmospheric Impurities, Analysis of Air and Water.

(γ.) SANITARY LEGISLATION.—Knowledge of the Acts of Parliament in force for the preservation and protection of Health.

(δ.) VITAL STATISTICS.—Rates of Births, Deaths, and Marriages. The Methods of Calculation, Classification and Tabulation of Returns of Sickness, and Mortality, Data and Conclusions deducible therefrom.

(ε.) METEOROLOGY, CLIMATOLOGY, AND GEOGRAPHICAL DISTRIBUTION OF DISEASES IN THE UNITED KINGDOM.

(ζ.) SANITARY MEDICINE, more especially Epidemic, Endemic, Epizootic, and Communicable Diseases. Diseases attributable to Heat, Cold, or Damp; Insufficiency or Impurity of Air, Food, or Drink; Habitation, Occupation, Over-exertion, Intemperance, Heredity; Preventive Measures, Vaccination, Isolation, Disinfection; the regulation of Noxious and Offensive Manufactures and Trades, the removal of Nuisances.

(η.) PRACTICAL HYGIENE, in reference to Site, Materials, Construction, Lighting, Ventilation, Warmth, Dryness, Water-Supply, and Refuse Disposal of Dwellings, Schools, Hospitals, and other Buildings of Public and Private Resort; Action with respect to Nuisances, and Outbreaks of Disease; other duties of a Medical Officer of Health.

The Examination shall be by Written Papers, Practical, and *viva voce*.

In the Practical Examination, the Candidate shall be required:

i. To report upon the condition of some actual locality.
ii. To analyse liquids and gases.
iii. To explain the construction of and the uses of instruments employed in Meteorology.
iv. To make Microscopic Examinations.

4. That the fee shall be five guineas.

B.—For the Certificate of Proficiency in Sanitary Science, for Medical Officers of Health, of five years standing, obtainable, only, by those members of the Profession, who have obtained a registrable qualification before January 1, 1877:

1. That the Candidate shall be a registered Medical Practitioner.
2. That the Candidate shall have acted as a Medical Officer of Health for five years.
3. That the Candidate shall not be under thirty years of age.
4. That the Candidate shall be required to pass the same Examination as particularised under the heading A.
5. That the Candidate shall write an Essay upon some practical sanitary subject, and shall be Examined upon the Essay, and upon other sanitary questions.
6. That the fee shall be ten guineas.

PROGRAMME OF THE EXAMINATION FOR THE CERTIFICATE OF PROFICIENCY IN SANITARY SCIENCE.

FIRST DAY.—*Morning, Four Hours, 9 to 1 o'clock.*

PAPER OF QUESTIONS.

Physics	2	8 Questions.
Chemistry	3	
Sanitary Legislation	3	

Afternoon, Three Hours, 2 to 5 o'clock.

To Report upon the condition of some actual locality.

SECOND DAY.—*Morning, Four Hours, 9 to 1 o'clock.*

PAPER OF QUESTIONS.

Vital Statistics	2	8 Questions.
Sanitary Medicine	3	
Practical Hygiene	2	
Climatology, Meteorology, etc.	1	

Afternoon, Three Hours, 2 to 5 o'clock.

To make Analyses.

THIRD DAY.—*Morning, Two Hours, commencing at 10 o'clock.*

Viva Voce—Interrogation.

Afternoon, Three Hours, 2 to 5 o'clock.

To make Microscopical Examinations, and to give a description of, and to explain, Meteorological Instruments.

FOURTH DAY.—*Morning, Two Hours, commencing at 10 o'clock.*

Examination upon Essay.

NOTICE.

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Original Papers.

THE INSANITARY CONDITION OF MILK-SHOPS, AS BEARING UPON THE DISSEMINATION OF DISEASE.

BY ERNEST TURNER, F.R.I.B.A.

'THE relation of zymotic disease to milk is one of the most important questions in etiology of the present day.' Such is the deliberately expressed opinion of Dr. Russell, medical officer of health for the city of Glasgow, published shortly after the epidemic of typhoid fever at Parkhurst, in January, 1873. The paper by Dr. Dougall, written at this time, on 'The Dissemination of Zymotic Diseases by Milk,' is one of the first essays on the subject, which has since received much attention from eminent medical authorities and chemists.

Among the conclusions drawn by Dr. Dougall are the following: 1. That milk is a congenial soil for the propagation of zymotic poison. 2. That it may become infected by (*a*) impure water and (*b*) impure air. 3. That when so infected it may communicate fever to individuals who have neither inhaled the emanations directly from enteric excreta, nor swallowed enteric water, nor respired enteric sewer gas, but who have simply partaken of milk rendered zymotic by exposure in the vicinity of a typhoid patient. He adds that the mere proximity of milk to aerial contagia or the mixture with it of a small quantity of water impregnated with the poison, might be of little consequence were it not that the milk itself constitutes a congenial soil for their multiplication, and like all such soils will be sure to produce a very large crop from a very small quantity of seed.

From such premises the conclusion is tolerably obvious. If we do not wish to propagate zymotic disease we must take especial care to keep the seed of it from such a soil, and such a soil from the seed.

The question, I need hardly say, has already received a considerable share of the attention a subject of such importance must, when once its importance is recognised, always attract. Investigation and legislation have both been busily at work, and in both directions progress has unquestionably been made. In both, however, there is still something to be done. In respect of the former no collated account of the results obtained from the various inquiries instituted has, so far as I have been able to ascertain, as yet been published. In respect of the latter, legislation, excellent and useful enough so far as it has gone, has yet stopped short of its necessary scope, and that in a most important particular. It is with these points, and more especially with the latter, that I propose to deal in this paper.

1. I believe the first instance on record where milk was suspected to be the medium of infection, was at Penrith, in 1868. Dr. Michael Taylor, writing at that time, says: 'Hitherto one medium of communication of the morbid seminium from without to the healthy frame, has been generally recognised; namely, the air by which it is borne to the lungs and imbibed by inspiration.'

He then describes how a girl suffering from typhoid fever was imported from Liverpool to Penrith. Two other children took the infection. Adjoining the premises was a byre, where two or three cows were kept, the milk being retailed to fourteen different families in the town. In seven of the families supplied, fever occurred. On inquiry it was found that the mother of the infected children nursed them and milked the cows. The children lay in the kitchen into which the milk was brought from the byre before being taken out in tins for distribution.

2. Shortly after the Penrith affair there was an outbreak of scarlatina at St. Andrews. Of this outbreak, as observed by Dr. Bell, the facts are briefly these. The wife of a farmer returned from a visit to a place where scarlet fever had occurred, and fell ill. She herself milked the cows. A boy, who occasionally assisted her in doing so, and who carried milk to town, had the disease lightly and peeled. Lists were made of the houses in St. Andrews in which scarlet fever had shown itself, and of the houses supplied with milk from this dairy, and with one exception there was perfect agreement in the lists. There were in all twenty-six cases, and in every house to to which milk had been sent, scarlet fever had occurred.

3. An outbreak of typhoid fever, occurring within a very limited area in the parish of Islington in 1871, when, between July 3 and September 10, it was found that 168 people had been attacked with the disease, caused no little excitement and alarm, and the questions, how the fever originated? and how was it disseminated? gave rise to a good deal of speculation. Thanks are due to Dr. Ballard for the great zeal displayed in his investigation as to the cause of this outbreak. One suggestion was that, in making a railway cutting, old drains and sewers had been cut across and miasmata released. Another was that the fever was due to the effluvia from the large dung shoots of a stable, where several hundred horses were kept. A third, that it was due to local sources of miasma developed in the dwellings attacked. All these suggestions were carefully investigated by Dr. Ballard, and his report gives logical arguments for dismissing the first two, and for the conclusion that, although the third might have operated in a minority of cases, the principal cause was to be looked for elsewhere. Finally, a fourth suggestion was made by a lady, in whose house, as in the houses of four of her friends, fever had appeared. It occurred to her that she had some time previously changed her milkman, and had induced these four friends to deal with the same tradesman. She mentioned this to her medical attendant, and it so happened that he was attending the family of the milkman in question for typhoid. Here was the first link in the chain of evidence. Others followed, and a chain was soon completed that left no doubt as to the correctness of the surmise. Out of 142 families supplied with milk from the dairy in question, seventy were invaded, yielding 175 cases in all, of which thirty were fatal. The details of this investigation are most interesting and instructive, but I have not space for them here, and must confine myself to a general outline of the various epidemics investigated. How the typhoid contagion got into the milk in this instance cannot be stated with certainty. A water-tank, however, was found underground, and from this rat-burrows had been made communicating with the drains. It was not suspected that water was added to the milk from this tank, as there was a tap, having a different supply, which would have been more convenient for this purpose. But the water was used for washing the cans.

4. In 1872 an outbreak of typhoid at Armley, near Leeds, was investigated by Dr. Ballard and Dr. Robinson, the result of their inquiries being that there were 449 houses in the district, that the total number of houses invaded was sixty-eight, yielding 107 cases, of which eleven were fatal. Assuming that on an average there were five people in each house, the population of the district would be about 2,245. It appears that about 15 per cent. of the houses were invaded by the fever, and nearly 4·8 per cent. of the population attacked by it. Of the sixty-eight houses invaded, fifty-one, including that of the milk-seller himself, were supplied with milk by the dairyman in question, thirteen were supplied by other milk-sellers, one received no milk from anybody, and the source of supply to three was doubtful. Out of the 449 houses in the district 132 were supplied with milk from a dairy where the man had been suffering from the disease. Of the 317 remaining to be accounted for, thirty-seven never took any milk at all; in respect of three the supply was doubtful, and 277 families occupying the remaining houses distributed their custom among eighteen different milksellers. Altogether 37·8 per cent. of the families the dairyman supplied with milk after he himself had been attacked with enteric fever were invaded by the same disease, while only about 5·3 per cent. of the families supplied by eighteen other milksellers, or not taking milk at all, suffered from the fever. The cause is attributed to washing the cans with water from a well that had been contaminated by sewage.

5. A second outbreak occurred in the same year in the town of Leeds. This was reported upon by Dr. Robinson. It appears that a farmer had typhoid fever and died, and subsequently five members of the household suffered with the disease. A Leeds dairyman purchased his milk at this farm. An outbreak of typhoid occurred in Leeds within a limited area; and as near as could be ascertained ninety-three cases occurred, of which number eighty persons obtained milk from the dairyman referred to, fourteen of these cases being fatal. Dr. Robinson says: 'On one of my visits to the farmhouse I saw unclean linen placed side by side with the lids of the cans, on the same table, and as the door of the sick room communicated immediately with both kitchen and dairy, and was generally open, the air of the sick room was common to the kitchen and dairy. The beds in fact were placed downstairs, in order that the double duty of attending upon the sick and household work might be the more conveniently performed. With such arrangements then it will readily be seen that abundant opportunity existed for contact of fever-poison with the milk vessels during their stay in the house.'

6. In 1873 Dr. Ballard investigated an outbreak of typhoid at Moseley and Walsall Heath, near Birmingham. Fifty families, twenty-three in Moseley and twenty-seven in Walsall Heath, were invaded by the disease between 24th of November 1872, and 6th of January 1873, yielding altogether ninety-six cases, ten of which were fatal. Of the fifty families, forty-seven obtained their milk-supply from two milk-shops situated close together. There was nothing—and this is a point to which, with reference to the second object of this paper, I would direct especial attention—to indicate any injurious quality in the milk as supplied by the farmers. Dr. Ballard thus sums up the etiology of the outbreak. 1. Two wells, upon adjoining premises occupied by milk-sellers, became impregnated early in November with the infectious matter or virus of enteric fever through the soakage into them from a privy of excremental matter containing the matter of infection. 2. Through the medium of water drawn from those wells, the milk supplied by these milk-sellers became poisoned, and many of their regular customers who drank the milk suffered from the disease. 3. The same infected milk having been sold to two other milk purveyors some of the milk supplied by these milkmen became contaminated in a similar manner. 4. There is no evidence to show that the disease spread in these districts in any other way than through the consumption of these infected milks.

7. The outbreak of typhoid in Marylebone in 1873, was perhaps the means more than any other epidemic of bringing the subject prominently before the public, and although many questioned the cause of the outbreak which Dr. Murchison early believed had been introduced by the milk-supply, Mr. Netten Radcliffe of the Local Government Board and Mr. Power who assisted him in conducting the investigation, say 'that the probability of the outbreak having been caused by an infected milk-supply amounts for all practical purposes to a certainty. Indeed, it is difficult to understand how anyone who will take the trouble to acquaint himself with the facts, can arrive at any other conclusion. The metropolis was at the time, and had been for some weeks previously, remarkably free from typhoid. The inquiry extended to 244 cases in 143 households, mostly occurring in part of St. George's parish north of Piccadilly, a part of Paddington to the south, and west of the Great Western Railway station. Of the 244 cases, 218 or about 90 per cent occurred in families drinking a particular kind of milk known as 'Nursery milk' from the same dairy, and the connection was strengthened by the progression of the cases having this milk-supply as contrasted with the cases in households having a different supply. It was also ascertained that the mass of the distribution of the milk-supply in question coincided very closely with the area of the outbreak, no other cause being apparent to explain such peculiar limitation. One very striking incident may be noticed in the fact that an isolated group of twelve cases of fever occurred in St. Anne's, Soho, when it was found that eleven of the patients procured skim milk from a branch establishment of the same dairy, the sale at this shop being limited to about thirty customers. Other circumstances are mentioned in this exhaustive report, tending to support the conclusions arrived at. It was ascertained on inquiry that there had been a case of enteric fever at the farm where the 'nursery milk' came from, and that as a precautionary measure, the discharge from the patient had been removed to and buried in an ash heap at some distance from the farm buildings. Soakage from certain pigsties had, it appeared, made its way along the foundations of a wall into the well from which water was taken for dairy purposes, and against the same wall stood the ashpit in which the enteric fever stools and slops had been buried.

8. Parkhead, a suburb of Glasgow, was visited by an epidemic of enteric fever in January 1873, the particular district where fever was prevalent consisting of streets of two-story cottages, chiefly tenanted by weavers, who live in a comfortable way, and are of cleanly habits. The general sanitary condition of the district is good. There are no water-closets, the combined ashpit and privy being universal; and

there is an abundant water-supply from Loch Katrine. Instances of contagious fevers are uncommon, and epidemics had been hitherto unknown, but on this occasion a severe and distinctly localised outbreak of enteric fever occurred, especially limited to the second and third weeks of the month. Most interesting details are given of this outbreak in Dr. Russell's report to the Committee of Health. It was found that at the end of 1872 enteric fever had existed in the family of a dairyman, that in the month of January, 1873, there were fifty-three cases in the neighbourhood, and that forty-six of these had been supplied with milk from the infected dairy. In five streets, where the milk-supply of every family was ascertained, out of seventy-three families thus supplied, twenty-two had fever, and out of 146 supplied elsewhere only two had fever. How the germs of the disease got into the milk could not be ascertained, but the person who nursed the children also milked the cows.

9. In Brierly, Bradford in April, 1874, a dairyman was attacked by typhoid fever. Out of eighty-seven houses in the district, the persons residing in thirty-eight used milk from his dairy, and among these twenty-three cases of fever followed, whereas in the remaining forty-nine houses there were only eleven cases, the relative proportions being 60·5 to 22·4 per cent. of the whole.

10. Early in 1875 an outbreak of typhoid occurred at Crosshill. Dr. Duncan, from whose observations the history of this epidemic is drawn, had in his own practice sixty-eight patients, and sixty-four of these were supplied from dairies at Eaglesham, where it was shown that opportunities existed for the milk to get contaminated. At one of the farms, two children were down with typhoid fever. They lay in a little bedroom opening into the kitchen, which again opened into the dairy. In this case the direct emanation from the sick might easily be absorbed by the milk.

11. A most interesting and careful investigation by Dr. Buchanan into the circumstances attending an outbreak of scarlatina at South Kensington is given in one of his reports to the Local Government Board. It appears that on June 9, 1875, a dinner-party was given at a house in South Kensington, where the household consisted of a gentleman and his wife, two sons, four daughters, two young children, and seven servants. Twelve guests sat down to dinner, with the host, hostess, and the eldest son and daughter. In the evening the whole of the family assembled in the drawing-room, together with about 150 other guests. The service of the house was augmented on this day by an extra cook, five waiters, and a charwoman.

Within five days of this date eighteen persons who were in the house on that day were taken ill, twelve with scarlatina, and six with sore-throat and other symptoms resembling scarlatina.

Of the family	. . .	4 out of	7
,, servants	. . .	3 ,,	7
,, dinner guests	. . .	6 ,,	12
,, evening guests, so far as known	. . .	4 ,,	150
,, occasional servants	. .	1 ,,	6

The disease did not spread beyond those originally attacked, except in the form of feverish sore-throat to persons in communication with two of the patients. The evidence respecting direct infection was negative. It could not be ascertained that any member of the household or any occasional servant had been in communication with any case of scarlatina, and the circumstances of the outbreak were not such as to suggest infection from guests. No local conditions in the house could be discovered of a kind to generate or convey contagion, nor were there any cases of scarlatina in the adjacent mews. Inquiry proved that a store of cream was taken in on June 9, which was delivered partly at four o'clock and partly at five o'clock; that the four o'clock supply was said to have come from a London dairy, and the five o'clock from a dairy in Hampshire. Dr. Buchanan says: 'Now the cook explains that the four o'clock supply was used essentially in the preparation of dishes of ice pudding, custard, and creams, whereas the five o'clock supply was sent up to the dinner and evening tables for eating with fruit and for use in coffee and tea. Of the four o'clock cream, however, some that was in excess of the cook's requirements was put into one or two jugs along with more or less of the five o'clock cream. Hence while the general cream supply of the day was from a Hampshire, the distinctively dinner supply was from a London dairy. Evidently so far as there may be a question of milk in relation to scarlatina, the question can hardly, if at all, concern the five o'clock (Hampshire) supply, which was partaken of by large numbers of evening guests without any result. The question must be of the four o'clock supply, that which was used on the one hand in preparation of dinner dishes, and on the other hand to some very limited extent in the same way as the other supply. For this four o'clock cream was distributed essentially to the family and the dinner guests, and next day in the shape of certain dishes that had come untouched from the dinner-table to four ladies of the family and their then guests, and scarlatina was distributed essentially among the family, and to the dinner guests, with special incidence to the ladies who were at lunch next day. On the other hand, the four o'clock cream was not generally distributed among the evening guests. It is thus seen that the four o'clock cream and the scarlatina went, in the main, together.' Other points are clearly brought forward in this report, and the relation between the cream supply and the scarlatina appears established. The evidence as to the mode of contamination, however, is by no means conclusive. Indeed, the only cause suggested is, that a boy employed to milk the cows and carry out the milk had a sore throat in the middle of May. It is possible that Dr. Buchanan never saw the dairy the cream actually came from at all, as many cowkeepers have a certain number of show cows and a show dairy, which they invite the public to view and see the cows milked, but the number of cows kept there is frequently not nearly sufficient to yield milk for the supply of all their customers. The suggestion may be useful to medical officers in future inquiries, and may help to account for disease occurring in some households and not in others, although *apparently* obtaining their milk-supply from the same source.

12. In the last week of August, 1875, enteric fever occurred in the family of a dairyman in Glasgow, and between this date and the last week of September, out of 493 people supplied from this dairy in four streets there were fifty-eight fever cases and thirty cases of suspicious sickness, whilst out of the remaining 579 people not using milk from this dairy there was only one fever case and none of suspicious sickness.

13. The record of Mr. Spear, medical officer of

health of Jarrow, is another interesting addition to the history of epidemics due to the distribution of infected milk. Within sixteen days in August, 1875, thirty-four cases of typhoid occurred in twenty families living within the urban district. The houses in which the disease appeared were generally clean and wholesome, with a plentiful water-supply and good drainage. It was soon found that the milk-supply came from a farm at Monckton, and the medical officer having found this to be the case, stopped the cart on its way to the town and prohibited the distribution of the milk until further inquiries had been made. Upon visiting the dairy it was discovered that the owner and six of his family were laid up with typhoid, and that not only was the cesspit in direct communication with the well, but that there was direct communication between the dairy and a room in which some of the fever patients were lying. The dairy was used also as a wash-house, clothes of the patients having been washed there, and one of the daughters who was frequently with her sick relatives milked the cows. The cases may be classified thus :

1. Undoubted cases of typhoid in families using milk from the Monckton dairy . . .	25
2. Doubtful cases—probably mild typhoid—in families using milk from the Monckton dairy	3
3. Cases of typhoid—information indefinite .	3
4. Case of typhoid attributed to defective drainage	1
5. Cases not accounted for	2
Total	34

14. Dr. J. W. Moore, physician to the Meath Hospital, mentions several cases of typhoid occurring in a school at Dublin in 1875, which he is of opinion were propagated through the agency of milk.

15. In the year 1876, the medical officer of health of Bolton reported that the contaminated milk-supply from Eagley stood more prominent than any other cause operating during the year to produce typhoid. In the last week of January and first fortnight in February, over 100 persons were attacked with symptoms of typhoid fever, the total number during the epidemic being 137, of whom seven died. It was proved that the course of the epidemic followed that of the milk-supply from a dairy where the water was polluted by fæcal matter. It was observed that in some cases vomiting came on immediately after drinking the milk, especially when unboiled. In a family of nine, eight of the members who drank it had typhoid fever, while the mother, who took none, remained perfectly well. It was also observed that the virulence of the disease bore a direct relation to the quantity of milk taken.

(*To be continued.*)

THE LOCAL GOVERNMENT BOARD AND MEDICAL OFFICERS OF HEALTH.

WE have so often drawn the attention of our readers to the vacillating and unstatesmanlike policy of the Local Government Board in their dealings with the question of the appointment of medical officers of health, that we feel reluctant to enter again upon a subject which has been so thoroughly threshed out. Our apology, however, must be the great importance with which a satisfactory settlement of this question is invested, from the fact that it is in the initiative of the medical officer of health that all serious sanitary proceedings rests, and that, therefore, on the proper selection of such officers the reality and efficiency of so large a portion of sanitary work depends. It is unnecessary for us to remind our readers that when the Government drafted the Public Health Act of 1872, they had before them three courses in regard to the appointment of medical officers of health, viz., to provide that the poor law medical officers of each union should be the medical officers of health for the union district, without any special supervision or assistance in their work; to sanction the appointment of a medical officer of health either for the union, or for one or more unions in combination, without any relations to the poor-law medical officers; and, lastly, whilst making the poor law medical officers of health what may be called medical officers of health of first instance, to appoint special medical officers of health for large districts, who should be the means of co-ordinating and systematising the sanitary work of those districts, of maintaining some sort of control over the work of the union medical officers in them, and of advising and assisting them in cases where such interposition might be required. It is scarcely needful for us to say that the latter of these three courses is the most rational, and the one which we have always consistently advocated, nor to remind our readers that this was precisely the course which the Government did not think it fit to adopt. With an utter absence of any definite plan in regard to these appointments, which is scarcely credible, and with an inconsistency in their proceeding which is the reverse of creditable, the Local Government Board, as is well known, recommended through their inspectors first one expedient and then the other, until the whole matter of these appointments had got into a perfect muddle.

In this state of confusion there was, however, one loophole for escape, one circumstance which left room for hope to the friends of sanitary progress, that the error thus committed, though a serious, was not an irremediable one. The appointments themselves were limited to five years, and though five years is quite sufficient in many cases to create vested interests that could not fail to interfere seriously with any radical re-organisation that might subsequently be considered desirable, still it was not an absolute obstacle to such a re-organisation, and its obstructive effect might be considerably modified by the adoption on the part of the Local Government Board, at an early stage of this probationary period, of a tone in their communications with local authorities which would indicate that they had resolved on adopting a more definite policy for the future. Under these circumstances great interest has naturally attached to the proceedings of the board in regard to the re-appointments which during the five years that have now elapsed since the Public Health Act was passed had to be successively made in various parts of the kingdom. Of all the first appointments which were made under the Act, we believe that we are within bounds in stating that not 5 per cent. were made for the maximum period of five years. There has, therefore, been abundant opportunity for the Local Government Board, especially during the last two years, when most of the appointments for large districts have fallen in, to indicate to the local authorities what course they intended to pursue in the future. Such a method of proceeding would have been not only creditable to the board as indicating that they had at least succeeded in grasping the problem with which they were called upon to

deal, but would have been fair to the local authorities themselves, who have in many cases been involved in a good deal of needless trouble and expense through want of any indications of such a policy, as well as equitable to those gentlemen who had thrown up other work to take the larger districts, and who have been placed in a position of uncertainty as to the continuance of their appointments, which cannot have been very conducive to an energetic discharge of their duties.

What, then, has been the conduct of the Local Government Board in this juncture of affairs? Have the Board given any indications of having formed a policy in regard to these appointments? Or are they still in the same state of irresolution in which they were five years ago? We regret to say, that although there is some evidence that the board have formed something like an opinion on the matter, the proof that they have mustered up the courage to act upon it, is of the most unsatisfactory kind. In some cases of large combined districts, the medical officers of health have been re-appointed on the same terms as before; but, so far as we are aware, only for the same limited period as the first. In other cases portions of these districts have been allowed to secede without, so far as we can learn, being called upon to give any sufficient reason for so doing, or without any inquiry such as would be held if a poor law medical officer were dismissed. In one case only, within our knowledge, has an authority which wished to secede from a combined district been coerced by the Local Government Board into remaining in it. Where the poor-law medical officers had been appointed medical officers of health, their re-appointment has, we believe, been in every case sanctioned by the Local Government Board, though in so doing the board have, it is true, generally protested against the expediency of such appointments. A somewhat amusing instance of this inconsistency on the part of the board has recently occurred at Plympton, where the Board of Guardians were desirous of re-appointing the poor law medical officers, alleging as their reason for so doing, that they had done their work efficiently. Now it must be obvious that such a case as this could only be dealt with on a general and uniform principle. If the Local Government Board were of opinion that, as a general principle, the appointment of poor law officers as medical officers of health was inexpedient, they should have been prepared to tell the Plympton authority that they had arrived at that conclusion, and that they would not, therefore, sanction the re-appointment. If, on the other hand, they were not prepared to refuse their sanction to the re-appointment, their proper course obviously was to give it and to say nothing on the subject. The very last thing they should have done was to do what they did, viz., to state that 'from the experience they have had in other cases of the result of similar appointments they cannot but consider a continuance of the above arrangement open to serious objections,' and then to add, 'in deference to the wishes of the sanitary authority, however, the board assents to the arrangement until March 25 next.' Could any *non sequitur* be more feeble or ridiculous than this? Why, if there is anything which could justify the sanction of the board to such re-appointments it would be, not deference to the wishes of a sanitary authority, but the fact that the appointment had worked well. If the board had satisfied themselves by inquiry that such was the case they should have given their sanction without demur, and if they had failed to satisfy themselves on this point they should have refused their sanction altogether. To approve of the re-appointments for one year was simply to increase the difficulty in the way of re-organisation, if the board are really resolved on it, or to perpetuate a piece of gratuitous stupidity if they are not.

With such evidence as this before us of the mind of the Local Government Board, or, perhaps, as the late Lord Westbury would have said, of what it pleases to call its mind, we must confess that we have but small hope of anything like a comprehensive or statesmanlike treatment of this important question from the present representatives of the board. They either have not the intelligence to grapple with the subject and to work their way out of the difficulties by which it is surrounded, or, if they have, they are devoid of the courage and decision which are necessary in order to give effect to their policy. To protest against the appointment of poor law medical officers at one breath, and in the next to give it their formal sanction, is an indication of feebleness of purpose which is truly deplorable in an important department of the Government, but which, we regret to say, is only too much in harmony with other proceedings of the board, which are fast bringing it into contempt. So far as we have been able to learn, and we have taken some trouble in the matter, the proceedings connected with the re-appointments of the medical officers of health for most of the large districts have been bungled by the Local Government Board in a way which reflects the greatest discredit upon it. Re-elections have in many cases had to be made twice, and in one which is within our knowledge, three times over, in consequence of technical oversight by the local authorities of trivial matters upon which they had received no advice from the board. Portions of combined districts have, as we have indicated above, been allowed to withdraw from combination, and yet to appoint the medical officer of the district as their adviser, by a process of bargaining, which reduces the services of a professional man to the level of a huckster's wares. And last, but not least, gentlemen who had taken these appointments on the faith that they would not be deprived of them, or the value of them lowered, without proper inquiry and due cause shown, have had their salaries cut down in some cases to little more than half what they were at first, and have in all been exposed to an amount of trouble and anxiety for which there was not the slightest justification. Really, it seems as if the Local Government Board were resolved on achieving for itself a distinction amongst the departments of State analogous to that which characterises the Bourbons amongst monarchs, with the trifling difference that it learns nothing and forgets everything.

SEWER-GAS AND DWELLING-HOUSES.

IT is an axiom in engineering that the strength of the whole is equal to the strength of the weakest part. The spirit of this axiom should be applied as the test of the efficiency of all sanitary appliances. Efficiency to be thorough should not only be permanent under ordinary circumstances but ought also to be competent and able to stand the strain of extraordinary and special circumstances. Mere ordinary security is no security in a sanitary sense. Just as with musical instruments it is the little rifts and the

merest trifles in tensions that are powerful enough to work untold mischief. Moreover, mechanical sanitary appliances, from the very nature of their use, must encounter a great deal of abuse, and unless they are so constructed as to be able to bear this abuse, they are worse than useless.

No class of sanitary appliances have to undergo harder, or occasionally more brutal, wear and tear than those connected with drainage and drain ventilation and trapping. Therefore the palm must be awarded to that system or systems which, while performing its functions effectively, yet permits the greatest latitude in the conditions of usage. The drain that will not block nor silt up, the trap that will neither choke nor get untrapped, and the ventilator that, under the most varying conditions of atmosphere—hail, rain, snow, wind, or sunshine—actually keeps ventilating, are respectively and collectively the drain, trap, and ventilator to be sought for, and when found, adopted.

Absolute perfection is unattainable, for a certain amount of manual care and maintenance is a *sine quâ non* whenever and wherever machinery or mechanical appliance is made use of, and it is cheaper to bear the chance of an expense for occasional repair or examination than to incur the primary expense of providing for more than average risks, by over elaboration or unusual structural solidity. Here it must be noticed that in all sanitary appliances get-at-ableness should be a main feature. The stitch in time which saves nine, would, in ninety-nine cases out of the hundred be easily and inexpensively applied were its easy detection ensured by ready means of easy inspection being provided. Mr. Rawlinson, C.E., was the first apostle of this important feature, but his labours have not borne the fruit they deserve. Every thing about a house connected with drainage and ventilation, should be so constructed as to admit of inspection by an ordinary unskilled person, at any time and at any place. It is not enough to have a plan of the drains, etc., hung up in the hall, but these drains, etc., must be inspectable without the aid of any assistant or assistance, other perhaps than a candle.

If in the multitude of councillors—a doubtful fact—there is wisdom, most undoubtedly in the multitude of traps there is danger. For ordinary houses one trap ought to suffice, and for larger establishments one trap to each set or group of drains is ample. At the best, a trap is but a cesspool and under very ordinary conditions becomes itself a sewer-gas generator and household poisoner. Therefore in selecting a trap not only must its permanent trappism be carefully inquired into, but care must be taken to select one in which at each flush the trapping contents are changed. In a good trap, properly fixed, the fluid contents which form the seal are constantly and wholly undergoing replacement to the avoidance of stagnation and its concomitant decomposite horrors. But with this all important, constant, and thorough sweep out there must be no untrapping or unsyphoning as it is often called. What no trap will or can do, the users should do, and that is, after the discharge of any filth enough clean water should be afterwards discharged to carry this filth beyond the trap and so leave a pure water-seal only.

As to ventilation of drains, with almost a solitary exception, every sanitary engineer is of opinion that ventilation is necessary for the effectual prevention of sewer gas entering houses. It is only as to the special means that opinions differ. Some hold that a mere continuance of the soil-pipe to or above the roof, by removing pressure, removes the danger also. Applying the weaker place axiom, this method is insufficient; others would imitate the down-cast and the up-cast shafts of the coal mine to sewer ventilation, but they curiously omit the fire at the bottom of the up-cast. Under average ordinary circumstances there will be no movement worth the name in a pipe placed over a drain which has also another pipe, long or short, or an opening to the air connected with it. Where there is any movement or current it will sometimes be up, at others down. An extracting, or in case the way is reversed as some prefer, an injecting cowl is required to complete ventilation. Here again opinions vary as to the comparative merits of various cowls. A cowl to really act as a ventilator should act independently of the temperature of the contents of the tube it empties. Many cowls only extract when the air in the tube is lighter than that of the atmosphere and in still weather revolve by it. Others counteract their extractive power by the very self-same wind to which it owes its origin. Experiments are unfortunately made in the still atmosphere of a room, and not in actual service conditions in the open. A cowl made to revolve by mechanical means will often act as a real extractor, but when the revolving agent is the wind, this wind also prevents the escape of air from the cowl's sides or top. Wind cannot both impinge and allow egress at the same time and place. Therefore, in selecting a ventilating apparatus, much care must be exercised. The real test is the anemometer and its tell-tale applied in the open air and under everyday conditions.

Apparently the cart has been placed before the horse, for not one word has yet been said as to sewer-gas itself. Sewer-gas is not so much a scientific as a popular term. By it is meant the thousand and one products of the decomposition of the contents of sewers. One and all these products can be, and are daily, produced by the chemist, and, viewed as mere chemical products, are in themselves harmless, though sometimes disagreeable: but produced in a sewer they are often the evidence of the existence of or the vehicles for conveying other products or germs. So they are products of chemical decomposition plus something else, which, under circumstances favourable to it, can multiply and flourish to an amazing extent. In other words, with sewer-gas is also inhaled the germs of an early form of animal or vegetable life, which on certain conditions of human receptability developes into further activity, under which development we recognise blood-poisoning, typhoid, and kindred zymotic fevers. So our advice is, avoid all possible contact with sewer-gas, and, to do so simply but thoroughly, trap your sewer drain, and by efficient ventilation disconnect entirely the house from both sewers and drains.

IT is proposed among the physicians and hygienists of St. Petersburg to open a Hygienic Society in that city, which will be in close connection with the London Sanitary Institute, and with the Paris Société Nationale d'Hygiène. Hygiene obtains great attention among Russian physicians, and the fortnightly periodical *Zdorovie* (*The Health*), has already published, during the first half-year of its existence, some very valuable original papers by MM. Arkhanguelsky, Skrortsoff, Shapiro, Gue, Nicke, Hubner, Erisman, Tarkhanoff, Dobroshavin, and others.

THE

SANITARY RECORD.

FRIDAY, JULY 27, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

THE SANITARY REQUIREMENTS OF SCHOOLS.

A RECENT report by Dr. J. M. Fox, the medical officer of health for the district, read at the meeting of the local board at Workington, was chiefly devoted to a consideration of the sanitary arrangements of the Board Schools there. He describes them 'as being in such a shockingly filthy state as to be at once a shame to their promoters, a peril to the health of the children, and evidence of an utter disregard to their being instructed in cleanliness and decency.' As the definition of 'a house,' for sanitary purposes, includes schools and similar buildings, the School Board, as owners or occupiers of these premises, should be required to abate these nuisances and to prevent their recurrence.

But the Education Department are also interested, or ought to be, in a matter of this kind; the plans for all new schools must be submitted to them for approval, and they further require that every school, previous to receiving any annual grant, shall be 'healthy, drained, and ventilated, and provided with suitable offices; but to ascertain how far these conditions are complied with, an annual inspection is deemed sufficient; and the result in the schools referred to by Dr. Fox is that the children attending them 'are forced to make their way to the closets amid pools of sewage, and find them covered, floor and seat, with deposits of corrupting filth.' The Department are largely responsible for the condition of things above described, and in every school under their inspection where a similar state of things is allowed to continue. Either the requirements of health, ventilation, etc., should be removed from the list of conditions to be satisfied by a grant-receiving school, or in addition to the annual inspection when everything is prepared in the most efficient manner for the school inspector, there should be such frequent inspection at irregular intervals, of the sanitary conditions of every school as shall impress both upon members of School Boards and teachers, the belief that these conditions are powerful to influence the comfort, cheerfulness, and general well-being of the scholars. At present any such estimate is far from common among school authorities; and as far as we can ascertain, little or no useful information is offered by the department to them on the questions of drainage, ventilation, and other equally important points of school construction, and yet on these depend the healthy and suitable conditions of the buildings. The members of School Boards naturally take their cue from their advisers in London, and these matters are left to the architect, who carries into practice opinions based upon widely different local conditions and requirements. There is far too much, even in modern schools, thought of style and external appearance and harmony, though these are to be desired if made subservient to the requirements of sufficient light, and ventilation, and a consideration of the health and comfort of the scholars. There are now many schools in which an open window during school hours means an insufferable draught, and yet these are the only means provided for ventilating purposes. Entering such schools from the fresh air, especially in the manufacturing districts where half-timers form a large part of the scholars, the smell is quite offensive, and yet parents prefer their children to breathe that impure air rather than have them constantly ill with colds, which is the only alternative. In regard to sewage disposal, every system, good, bad, and indifferent, is in practice; the old privy and vault, the water-closet and cesspool, various forms of earth, ash, and pail closets, but unfortunately there is a want of that regular scavenging and attention to their working, which is an essential of success in every case. The need for a better supply of water, both for drinking and to give the children a practical lesson in the benefits of personal cleanliness, and other defects of school premises, are too well known and regretted by medical officers of health, but to provide what is deemed wanting, or to bring about improvements in the existing state of things, is met with objections which public bodies are more successful in urging than private individuals.

It might result in some beneficial change being made if the Education Department were informed of existing nuisances and defects which are suffered to continue unremedied by school authorities; for, to allow the present opportunity to pass by without the children being influenced in favour of better sanitary conditions is to defer the real success of our present efforts for another generation. Ignorance is the greatest obstacle sanitary science has now to contend with; it delays the passing of a much needed and more comprehensive measure of reform; it causes many wise recommendations to be received with suspicion, and the work to be carried out in a half-hearted and inefficient manner.

If the school children of to-day were trained in a knowledge of the simplest laws of hygiene, with a determined aversion to filth under all circumstances, the future work of sanitary inspectors would be less onerous, more gratifying, and followed by more successful re-

sults. It is surely the duty of the Education Department to assist in this matter, e g., it is often urged that teachers of elementary schools should be required to have some knowledge of the simpler laws of physiology and hygiene, they would then become intelligent helpers in the healthy training and oversight of the bodies as well as the minds of children. If teachers were themselves educated upon these questions, there would quickly follow an appreciation of their good effects in school life, and this would be the best guarantee for school premises being kept in a better sanitary condition, and such influences acting upon the children during their school life would be an earnest of future success in all sanitary work.

PUBLIC HEALTH (METROPOLIS) BILL.

IN noticing the withdrawal of this bill, we must express our regret that some of the proposed amendments were not pushed forward—which they might readily have been—although it was hardly to have been expected that Mr. Sclater-Booth would have taken so self-denying a course. The provisions for preventing one of the greatest metropolitan building scandals, viz., that of removing the sand and gravel, then building on the foul matter with which the excavations were filled up, would have been prevented; the exposure of infected persons in shops, and especially in milk-shops and chandlers' shops, which has been by no means unfrequent, would have been rendered illegal; the power of inflicting a penalty on those who neglected to remove a nuisance on the order of a local authority would have been given to a magistrate; and the managers of the District Asylums Board would have been empowered to arrange with the local authorities for the reception of non-pauper patients. These are pressing amendments of the existing sanitary law, and must be carried out if possible next Session; and it is certainly regrettable that the local authorities should have almost entirely overlooked the amending clauses, in their fear that the powers of the Local Government Board should be re-affirmed. The words in which Mr. Sclater-Booth withdrew the bill are certainly encouraging as regards the necessary amendments in the metropolitan sanitary laws, and it is to be hoped that the promised new clauses will not be mixed up with so much that is objectionable, and that therefore the local authorities will not consider themselves called upon to make such a vehement and uniform opposition to it as they have done towards the defunct. The opposition seems to have been somewhat unfounded, but it could scarcely have been so unanimous, if the vestries and boards had not almost instinctively felt that their power and freedom as local authorities would be decidedly curtailed. There is one thing which Mr. Sclater-Booth has omitted to take into his calculation, and that is the position and mode of action which the permanent officials of the Local Government Board have taken towards the authorities placed under their jurisdiction, by which they have rendered that board obnoxious to nearly all those with whom they have had any official business. Boards of guardians and local sanitary authorities have almost unanimously protested against the orders of the board, and they have done so equally as much when it was under a Liberal as they now do when it is under a Conservative chief.

Notes of the Week.

MR. GEORGE C. STRAWBRIDGE has been appointed urban sanitary inspector to the Taunton Town Council.

A PUBLIC institute and 'British workman' public-house has been opened at Grangemouth, Glasgow. The building has cost 2,600*l.*, and the meeting hall seats 400 persons.

MR. WESTCOTT has been re-elected surveyor and inspector to the borough of Basingstoke. His salary has been increased from 120*l.* to 130*l.* per annum, and a gratuity of 10*l.* awarded to him for extra work.

MR. WILLIAM THORNES, of Bradford, has been appointed assistant surveyor for the borough of Dewsbury, at a salary of 150*l.* per annum. There were 43 applications.

JAMES CUNNINGHAM, labourer, has been fined, at Hexham Petty Sessions, 5*l.* and costs, for lodging casuals in his house, without having his house registered in accordance with the Public Health Act, 1875. Mr. J. Baty, jun., prosecuted on behalf of Hexham Urban Sanitary Authority.

THE Salford analyst reports that during the quarter ending June 30, he examined sixty-two samples, consisting of twenty-eight of milk, eighteen of beer, seven of butter, three of sweet spirit of nitre, three of pickles, two of bread, and one of flour. Of these, twenty-two samples were adulterated—viz., milk sixteen, sweet spirit of nitre three, and butter three.

A DEPUTATION from the Charity Organisation Society last week brought under the notice of the Home Secretary the deplorable condition of poor Italian children, who were brought over to this country as assistants to street musicians. Mr. Cross replied that this abominable traffic had already engaged his attention, and anything that the English law could do to suppress it should be put in force.

THE Blairgowrie Police Commissioners have appointed Mr. Young, C.E., Perth, as engineer for the drainage of the burgh, the burgh surveyor having lately been dismissed, and Mr. Mackinson, Dundee burgh surveyor, having declined to superintend the works. Mr. Young is to use the late surveyor's plans as far as they go, and make a deduction from his fees accordingly.

CLEANSING PUBLIC BUILDINGS.

THE West End Branch of the Bank of England in Burlington Gardens has just been cleansed outwardly by one of Messrs. Merryweather and Sons' steam fire-engines. The performance occupied just one working day, which contrasted favourably with the several weeks' labour it would have taken if done by hand.

THE SANITARY CONDITION OF CROMARTY.

THE registrar of Cromarty, in some notes appended to his return for the quarter ending March 31 last, says:—Three epidemics have occurred during the quarter, viz., of typhoid fever, scarlatina, and diphtheria, altogether occasioning 16 deaths—hence the total number for the quarter, 28, is only nine less than that registered during the whole of 1876, and five less than during 1875. The virulency of these epidemics is attributed to the sanitary condition of the burgh, which is deplorable.

SWIMMING FOR CHILDREN.

A DEPUTATION from the London School Swimming Club has waited upon the National Health Society, 44, Berners Street, to solicit the support of that society for the extension of the efforts now being made to promote the art of swimming amongst teachers and scholars (male and female) of the public elementary schools of the metropolis. The club was formed in 1875, and since that time more than 6,000 children have been taught to swim under its direction. The club is in want of funds. Subscriptions will be received by the secretary of the National Health Society, 44, Berners Street.

THE POTTERS' DISEASE.

MR. GRIFFITHS, the medical officer of Fenton, reporting on the health of the district, referred to Dr. Richardson's recent lectures on unhealthy trades, and said that nearly 60 per cent. of working potters died from diseases of the lungs, and that the average age at death of adult potters is 46½. Mr. Malkin, a manufacturer, remarked on this that he did not believe it was so much the employment, as ignorance and thorough neglect of sanitary precautions by potters, that was to blame. Mr. Stubbs said it was sometimes the fault of the masters in allowing the men to work in small, unhealthy, crowded places.

THE CONSUMPTION OF COCOA.

OFFICIAL returns show that the consumption of cocoa continues to make rapid progress in this country, both as a beverage and as an article largely used in the composition of chocolate sweets and confectionery. The quantity on which duty was paid in 1876 was 10,428,000 lbs., against 9,274,000 lbs. in 1875—an increase of 4·6 per cent. The average rate of increase in the consumption of this article during the last ten years has been over 8 per cent. per annum, and the consumption per head of the population in quinquennial periods during the last fifteen years has been as follows: 1861, 0·12 lbs.; 1866, 0·14 lbs.; 1871, 0·23 lbs.; 1876, 0·31 lbs. So that whilst coffee has diminished in consumption to the extent of nearly 0·14 lbs. per head in that period, cocoa has advanced by about 0·19 lbs per head.

HEATED AIR.

DR. KAYSER, of Nuremberg, has lately conducted a number of experiments upon the effects of heating ordinary air, with especial reference to the warming of dwellings. The results appear in the last report of the Munich Industrial Museum, and may briefly be summed up as follows:—Air previously free from carbonic oxide was invariably found to contain this gas after heating. The tests were performed with chromic acid, and also with cuprous chloride. In order to test the products of the decomposition of the dust present in the air, about sixty litres of air, which had been heated, were drawn through an ordinary apparatus for determining carbonic acid, which contained absolute alcohol. The liquid assumed a yellowish brown colour, and flakey masses were suspended in it. The flakes were found to consist chiefly of carbon. After filtration and evaporation of the solution, a brown residue was obtained. This was insoluble in water, intensely acrid, and possessed a resinous, empyreumatic odour. The estimations of carbonic acid and water before and after heating showed no difference worthy of mention.

IMPURE WATER.

A WATERY extract of gall-nuts has been used by M. Fauré for detection of animal decomposition products in water. It has also been recommended to use tannic acid for improvement of bad drinking water. M. Kämmeren has recently advised the use of tannin for discovering putrefying animal products in water. He considers that the presence of gelatine in ground water can no longer be doubted, and it is often found in comparatively large quantities. The presence of salts and other compounds in water may delay the precipitation by tannin; hence the purity of water should not be affirmed, as regards tannin reaction, till after twenty-four hours of this. Every water which becomes troubled in a considerable degree through tannin must be held dangerous as drinking water. For this judgment it is all the same whether a precipitate occurs at once or only after a long time; for the time depends less on the nature of the precipitated body than on the dissolved substances which retard precipitation.

BOURNEMOUTH DRAINAGE.

J. A. HARRISON, ESQ., C.E., held an inquiry in the Town Hall on the 16th inst., consequent on an application by the Commissioners for sanction to borrow money for works of sewering, etc. The outlying districts of Boscombe and Springbourne have lately been added to Bournemouth, and Sir Joseph Bazalgette had submitted a scheme to the Commissioners, by which the drainage of Bournemouth was to be diverted from its present outfall opposite the pier, carried along the shore eastward, and being joined by the drainage from Springbourne and Boscombe, discharge 1,200 feet out at sea, and considerably nearer Boscombe than Bournemouth. It was also proposed to carry the shore sewer behind a sea wall, and to make a roadway over it, but the Commissioners decided only to carry out for the present so much of the sea wall as was necessary to protect the sewer, viz., about a quarter of a mile at the Bournemouth end. Considerable opposition was raised to this diversion and esplanade scheme, on the ground of the unnecessary expense with no corresponding advantage, but it was carried at the board meeting by 6 to 4. Similar objections were brought forward before Mr. Harrison, who stated that he should recommend the Commissioners to reconsider the scheme, with a view to keeping the shore sewer entirely unaffected by the tide. If this is carried out, a larger length of sea wall will be required, and an additional cost incurred.

Special Reports.

DOMESTIC ECONOMY CONGRESS.

THE first annual congress on this subject was held in Birmingham on Tuesday, Wednesday, and Thursday, the 17th, 18th, and 19th inst., by permission of the Royal Birmingham Society of Artists, at their Rooms, New Street. The congress was opened by a *conversatione*, at eight o'clock, on the evening of the 17th, at which Professor Huxley, at the request of the chairman, delivered an address. He said he was very glad on that occasion to have the opportunity of saying a few words upon the objects of the congress and the expediency of arousing public feeling in regard to the importance of the objects which it had in view, because that particular subject of domestic economy was one which had always possessed a very great amount of interest for him, and as far back as the year 1868, when it was his business to address a working-men's college upon the subject of what constituted a liberal education, he said, 'If anyone is interested in the laws of health it is the poor workman, whose strength is wasted by ill-prepared food, whose health is sapped by bad ventilation and bad drainage, and half whose children are massacred by disorders which might be prevented. Not

only does our present primary education carefully abstain from hinting to the workman that some of his greatest evils are traceable to mere physical agencies, which can be removed by knowledge, patience, and frugality, but it does worse. It renders him, so far as it can, deaf to those who would help him, and drives him to substitute an Oriental submission to what is falsely declared to be the will of God for his natural tendency to strive after a better condition.' He believed that those words remained as true now as he thought he might venture to say they were ten years ago.

Mr. Joseph Pope read a paper on 'Clothing and its Materials.'

Mr. Chadwick next spoke upon 'Head to Foot Washing,' which he advocated as a means of promoting health and strength in the first place; and, in the second place, as a safeguard against infectious diseases. Most doctors who had had large practice in connection with epidemics had come to that conclusion. If he were connected with a board of health, on the approach of an epidemic, the first thing he would do would be to issue a general order, and try to get the machinery for its execution, to have the whole of the population washed as a defence. He would almost go the length of having penalties for non-washing, as they had in the case of vaccination, which was enforced to prevent small-pox. It was a fact that in an epidemic the tub people had had a remarkable exemption. As to the means of having this washing, he mentioned that in a prison in France it was the custom to wash all the prisoners by throwing spray over them, then making them soap themselves and have another shower of spray. He thought that some system might be applied to schools where the children were unwashed, and which often were the centres of epidemics. If they had compulsory attendance at schools, and thus compulsorily exposed children to contagion, they ought to provide means of protection for them. A league for cleanliness was of just as much importance for the population as a temperance league, because filth and intemperance went together, as also did filth and idleness and vice.

The Rev. T. D. C. Morse read a paper by the Rev. Harry Jones, on 'Washing.' The writer of the paper alluded to the bathing practised by the Romans of former times, and by the Chinese and Japanese in the present day, whereas the average Briton rarely washed himself. He pointed out that disease was often taken into the mouth by eating the food with dirty hands. Swimming-baths and swimming should be encouraged as an integral part of education. This was a matter which might be taken up by every teacher, and, where possible, the addition of a bath to the equipment of a school might be made with the provision of a playground. He strongly advocated washing on sanitary grounds.

Miss Chessar next read a paper on 'Baths and Swimming for Young Children.' In the first place she remarked upon the necessity which existed for people learning to swim. It was a fact that baths and places where swimming could be taught were very few. In London, with its population of nearly 4,000,000, the public baths numbered only twenty-seven. It was also another fact that the art of swimming was possessed by comparatively few, and daily experience showed that the want of knowledge of swimming caused many otherwise avoidable deaths. In swimming, the younger the age at which the learner was taught the more easily was the art learnt. She then described an effort made to introduce the use of the bath, and to teach swimming, to the children of elementary schools in London. She was not aware that a similar effort had been made in any other towns. She hoped that the mention of the subject would induce others to take it up, and that more opportunities would be afforded for teaching children to swim, and especially that more facilities would be given for the teaching of girls and women to swim. With boys the difficulty as to their learning had arisen merely from the small number of baths and places where they could swim. In the case of girls the difficulty arose from a similar cause. Only three of the baths in London made sufficient provision for women. Another difficulty was that sufficient teachers could not be obtained. The effort to teach swimming to children of elementary schools had been made by the London Schools Swimming Club. The total number of children at present under instruction was about 2,000, at Victoria Park and many of the public baths. During the last year more than 6,000 teachers and scholars, male and female, received instruction under the club. The work which the club did was chiefly that of paying the expenses of swimming lessons, and endeavouring to obtain additional facilities for bathing and swimming, etc.

Professor Huxley read a paper on 'Elementary Instruction to Children in Physiology.' He said the chief ground upon which he ventured to recommend that the teaching of elementary physiology should form an essential part of any organised course of instruction in matters pertaining to domestic economy was, that a knowledge of even the elements of the subjects supplied those conceptions of the constitution and mode of action of the living body, and of the nature of health and disease, which prepared the mind to receive instruction from sanitary science. It was eminently desirable that the hygienist and the physician should find something in the public mind to which they could appeal, some little stock of universally acknowledged truths, which might serve as a foundation for their warnings, and predispose towards an intelligent obedience to their recommendations. Listening to ordinary talk about health, disease, and death, one was often led to entertain a doubt whether the speakers believed that the course of natural causation ran as smoothly in the human body as elsewhere. Indications were too often obvious of a strong, though, perhaps, unavowed and half-unconscious undercurrent of opinion, that the phenomena of life were not only widely different in their superficial characters, and in their practical importance, from other natural events; but that they did not follow in that definite order which characterised the succession of all other occurrences, and the statement of which was called a law of nature. He was not quite sure whether the idea that disease and death were direct and special interferences of Deity, did not lie at the bottom of the minds of a great many people, who would vigorously object to give a verbal assent to the doctrine itself. However that might be, the main point was, that sufficient knowledge had now been acquired of vital phenomena to justify the assertion that the notion that there was anything exceptional about these phenomena received not a particle of support from any known fact. On the contrary, there was a vast and an increasing mass of evidence that birth and death, health and disease, were as much parts of the ordinary stream of events as the rising and setting of the sun, or the changing of the moon; and that the living body was a mechanism, the proper working of which they termed health; its disturbance, disease; its stoppage, death. The activity of this mechanism was dependent upon many and complicated conditions, some of which were hopelessly beyond our control, while others were readily accessible, and were capable of being modified by our own actions. It was the business of the hygienist and physician to know the range of those modifiable conditions, and to direct the public how to influence them for the maintenance of health and the prolongation of life. An intelligent assent to such directions on the part of the public must be based on knowledge, and that knowledge meant an increased acquaintance with the elements of physiology. Although the depths of physiology might baffle the researches of the most highly trained and well-furnished intellect, its elementary and fundamental truths could be made clear to a child. A knowledge of the elements of physiology was not only easy of acquirement, but it might be made a real and practical acquaintance with the facts as far as it went. The subject of study is always at hand in oneself. The principal constituents of the skeleton and the changes of form of

contracting muscles might be felt through one's own skin. The beating of one's heart and its connection with the pulse might be noted; the influence of the valves of one's own veins might be shown; the movements of respiration might be observed; while the wonderful phenomena of sensation afforded an endless field for curious and interesting self-study. Of course, there was a limit to that physiological self-examination. But there was so close a solidarity between ourselves and our poor relations of the animal world, that our inaccessible inward parts might be supplemented by theirs. A comparative anatomist knew that a sheep's heart and lungs, or eye, must not be confounded with those of a man; but so far as the comprehension of the elementary facts of the physiology of circulation, and of respiration, and of vision, was concerned, the one furnishes the needful anatomical data as well as the other. Thus, it was quite possible to give instruction in elementary physiology in such a manner as not only to confer knowledge which was useful in itself, but to serve the purposes of a training in accurate observation, and in the methods of reasoning of physical science. He did not want to make physiologists of all the world, and notwithstanding the adage, which he regarded as a very dangerous one, about a little knowledge being a dangerous thing, he really saw no harm which could come of giving our children a little knowledge of physiology. The instruction, however, must be real, based upon observations, eked out by good explanatory diagrams and models, and conveyed by a teacher whose knowledge has been acquired by study of the facts, and not the mere catechismal parrot-work which too often usurped the place of elementary teaching. In concluding his paper, Professor Huxley referred to what he termed the silly fiction industriously circulated by fanatics who knew that their assertions were untrue, that he had advocated the introduction of that experimental discipline which is absolutely indispensable to the professed physiologist into elementary teaching. But, while he should object to any experimentation which could justly be called painful for the purpose of elementary instruction, and while, as a member of a late Royal Commission, he gladly did his best to prevent the infliction of needless pain for any purpose, he thought it was his duty to take the present opportunity of expressing his regret at a condition of the law which permitted a boy to troll for pike, or set lines with live frog bait for idle amusement; and at the same time laid the teacher of that boy open to the penalty of fine and imprisonment if he used the same animal for the purpose of exhibiting one of the most beautiful and instructive of physiological spectacles—the circulation in the web of the foot. No one could undertake to affirm that a frog was not inconvenienced by being wrapped up in a wet rag, and having his toes tied out; and it could not be denied that inconvenience was a sort of pain. But they must not inflict the least pain on a vertebrated animal for scientific purposes (though they might do a good deal in that way for gain or for sport) without due license of the Secretary of State for the Home Department, granted under the authority of the Vivisection Act. Under the present state of the law, two persons might be charged with cruelty to animals. One had impaled a frog, and suffered the creature to writhe about in that condition for hours; the other had pained the animal no more than a human being would be pained by tying strings round his fingers, and keeping him in the position of a hydropathic patient. The first offender said, 'I did it because I find fishing very amusing,' and the magistrate bade him depart in peace—nay, probably wished him good sport. The second pleaded, 'I wanted to impress a scientific truth, with a distinctness attainable in no other way, on the minds of my scholars;' and the magistrate fined him 5*l*. He could not but think that this was an anomalous and not wholly creditable state of things.

Mrs. F. E. Hoggan, M.D., read a paper on 'The Substitution of Scientific Subjects for Fancy Work in Girl's Education.' The speaker laid great stress on the importance of teaching botany and physiology in middle-class girls' schools, and said she considered that a microscope should be considered as indispensable an article in a school-room as a piano. She believed that physiology, intelligently taught, fostered in children many a dormant faculty, strengthened the powers of observation, stimulated healthy and natural curiosity of the young, and brought children into relationship with the beautiful facts of nature.

Mr. E. Chadwick, C.B., directed attention to the practical improvement which was going on in the teaching of physiology in Germany. In consequence of the enormous losses on the field in the Franco-German War, resulting from want of information as to how to treat wounded persons, a new system of instruction had been instituted. Companies were assembled, and certain members were supposed to be wounded in various parts of the body. The men were instructed on the spot how to apply bandages, and take other measures to stay the mischief which had been done. This was a very important practical application of physiological knowledge.

(To be continued.)

THE WATER OF CARLISLE.

A CORRESPONDENT has sent us a report made by one of the Government departments on the water of the well at Hyssop Holme. The report is as follows:

June 16, 1877.

Hyssop Holme Well.—'The sample was clear and sparkling.

	Parts in 1,000,000.
Ammonia.	
Free	·01
Albuminoid	·06
Total	·07
	Grains per gallon.
Solids.	
Organic	12
Inorganic	33
Total	45

Nitrates: Trace. Chlorides, 5·4 grains of common salt per gallon. The remainder of solid contents is made up of carbonates and sulphates of lime and magnesia—latter small.' And our correspondent expresses his astonishment that in such an analysis the water should be pronounced good. The astonishing detail is that the water should contain 12 grains of organic matter per gallon and yet be pure.

To this we make the following rejoinder. If the water in question really contained anything like 12 grains of organic matter per gallon, it would be vile indeed, and instead of being drinking water would be fit only to be discharged by a sewer. We have no doubt, however, that the water contained nothing of the sort, and the 12 grains described as 'organic' are simply the 12 grains lost on ignition. Formerly the loss on ignition was mistaken for organic matter, but, as is now very generally recognised by chemists, loss on ignition includes 'water of hydration,' and sometimes even carbonic acid. It is certainly desirable that 'loss on ignition' should not figure in Government reports under the denomination 'Organic.'

HOME HOSPITALS FOR THE WELL-TO-DO.

A MEETING of the committee recently appointed to consider the scheme for the promotion of home hospitals for the well-to-do was held at the Mansion House on the 20th inst., under the presidency of the Duke of Northumberland. There were also present Sir Francis Hicks, Mr. George Stanley, Dr. Quain, Mr. Albert G. Sandeman, and Mr. Clifford Wigram, directors of the Bank of England, and Mr. H. C. Burdett. It was resolved to establish an association to provide homes which should be self-supporting for the treatment and cure of diseases, as in

hospitals, by skilled nursing, rest, and regulated diet, under proper sanitary and hygienic conditions, with the comforts of home, for the benefit of persons who could afford to pay in various degree for such advantages. It was stated that upwards of 200 of the best known members of the medical profession and others had testified to the necessity of such a step in a population like that of London, including millions of people above the class for whom charitable accommodation could be properly found available in hospitals, but whose homes or lodgings were incapable of affording to them the comforts and special appliances, the skilled nursing, and regular attention which are necessary in cases of sickness. To supply that want it had been decided to establish homes for invalids, at which all charges should be fixed at such a rate as should cover the expenses incurred. A draft scheme has been prepared by the provisional committee of this association. The difficulty to be overcome was how to raise the necessary funds to furnish, fit, and open the institutions. The committee have got over this difficulty by taking Marlborough and Cheltenham Colleges as their model, and creating governors by virtue of donations. Several subscriptions, amounting to nearly 1,500*l.*, have been promised towards the 20,000*l.* needed, and further contributions should be sent to the honorary secretary, at the Mansion House, E.C. A list will be published in a short time of those who have become governors of the association.

THE NATIONAL TEMPERANCE FETE.

ON the 10th inst. this *fête* was held at the Horticultural Gardens, ending with a concert at night in the Royal Albert Hall. Between the two parts of the concert, the chair was taken by Sir Harcourt Johnstone, M.P. Dr. Richardson gave an address, showing how far scientific evidence and everyday experience tallied in respect to total abstinence from drinks containing alcohol. In the course of his address, he said: We know that a proper food is one that will make and maintain the vital heat of the body. We know now scientifically that the effect of alcohol on the body is to reduce the vital heat, and that in its baneful action it runs hand in hand with cold. We know that generally a proper food ought to nourish and sustain the body during exposure to extreme heat. We know now scientifically that alcohol renders the body more prostrate during such exposure, and that taken in excess under such exposure it is an immediate cause of danger, and even of sudden death. We know that a proper food ought to maintain the animal activity, ought to enable the muscles of the body to perform good work, and to endure good work during long intervals of time. We know now scientifically that alcohol reduces the muscular power, and though it may for a passing moment give a flash to the muscular energy, it lessens the value and shortens the duration of the labour. We know that generally a proper food ought to build up the worn-out tissues of the body—all those parts which in the physical wear and tear of life are constantly demanding renewal. We know now scientifically, that alcohol is not constructed to play any such a duty; that if it adds any substance to the body, that which is added is a waste, weighty and hurtful; and we know further on this point that under the continual influence of alcohol all the active tissues are damaged and made inactive for their work. We know generally that a proper food should sustain evenly and effectively the physical nervous power, so that the muscles shall at due seasons be called by the nervous stimulus into natural activity. We know now, scientifically, that alcohol wildly exalts and then fatally depresses the nervous power; that as a man under its active influence first becomes excited, then depressed, and finally helpless and unconscious, so a man under its continued influence first becomes profligate of his life, then weak, and finally enfeebled, paralysed, and prematurely dead. We know that a proper food ought to sustain and support with evenness of judgment and wisdom the mental power; we know now, scientifically, that alcohol first excites the mind unduly, then depresses it into melancholy, and so often brings it into complete aberration that in some of our institutions for the insane as many as 40 per cent. per annum of those who enter are made to enter from this one simple cause alone. Then as to common experience, he referred to the late Arctic expedition, to the experience of those who lived in the tropics, of those who laboured in mines, of those who underwent feats of strength, to show that in extremes of heat and cold, in hardship, in protracted watching, indeed in all circumstances, abstention from alcohol gave best results, and he quoted statistics to prove that while the total abstainers were the longest livers, persons who relied upon the influence of alcohol made up a large number—40 per cent. per annum—of those who filled the lunatic asylums. In conclusion, he said that the inquirers would, if honest in the desire to arrive at the truth, arrive at the only possible conclusion, that scientific learning and common experience in this case stand side by side, and declare with one voice the one truth—that alcohol is not a food necessary for the wants of man, nor of any other thing that lives.

Medical Officers' Reports.

BURTON-ON-TRENT.—Dr. Perks' second annual report on the sanitary condition of Burton-on-Trent is above the average of annual reports in general interest. It is well printed, and contains information other than mere routine statistical facts. From this report we learn that Burton-on-Trent is 150 feet above sea level, that a rise of 2 feet in the river Trent causes an overflow, and 5 feet an inundation of the town. Twice in 1875, Burton underwent this inundation, and once in 1852. It is curious to note that the inundation before this last one was as far back as 1795. Inundation statistics are always interesting. Apart from their effect on health, it is important to determine how far we become year by year more subject to floods on account of improved drainage of lands and towns. It almost appears that while by drainage and land improvements, we have secured earlier and heavier grain crops, we have by the same means promoted inundations. We have not improved our rivers, while we have doubled the strain on their capacity.

Geologically Burton-on-Trent is scooped out of the New Red Sandstone, and rests on valley gravel, some 20 to 30 feet thick. The subsoil water level under the town is about 8 feet.

Great disproportion between house accommodation and population exists at Burton, but this Dr. Perks says is gradually being reduced. At the commencement of 1876 the population was 24,874, and the number of houses 4,395. The streets are mainly well paved and curbed and sewered, and run parallel to and at right angles to the river.

'But,' says Dr. Perks, after discussing some minor topics, 'the main questions for consideration are in reality: (1) Whence does the town obtain its water-supply? And (2) how are the refuse matters removed?' The water is obtained from two sources—the South Staffordshire Waterworks Company and private wells. Only 943 houses are supplied by the company, and the remainder get their drinking water from wells of an average depth of seventeen feet. These wells we can readily believe are, as a rule, contaminated and it is indeed high time that one and all of them were closed. The quality of the Company's water is, according to Dr. Hill of Birmingham, excellent. Dr. Hill's analysis is appended, and although Dr. Hill is well known as a disciple of Dr. Frankland, this analysis is remarkable for its departure from the usual Frankland forms. We have nitric acid (2·13 grs. per gallon), but no mention of nitrates or nitrites. Volatile and combustible matter (1·47), but no carbon nor organic carbon. Of ammonia the water is said to contain a trace.

With many other medical officers, Dr. Perks looks with grave suspicion on the connection between benefit societies and infantile mortality. It would indeed be well were the insurance of young lives entirely forbidden by legislation.

There is an appendix to the report on 'The Different Systems of dealing with Excrement.' This is generally so inaccurate and mistaken that in justice to the systems quoted, Dr. Perks should at once suppress it. It is meagre in the extreme, and as unreliable as meagre. Dr. Perks should obtain from the Local Government Board copies of their approved forms, and making use of these add his own valuable contribution to systematic national sanitary statistics. The report is a most interesting one, and on account of its general excellence both of accomplishment and intention is worthy of the corrections and additions we have pointed out.

GLOUCESTERSHIRE COMBINED SANITARY DISTRICT. This district is reported as being in a fairly good sanitary condition, except in a few isolated places. Dr. Bond, however, points out that scarlet fever and diphtheria have prevailed largely in the district, about 500 deaths having occurred in 1876 in Gloucestershire, the whole of which he considers might have been prevented by the measures recommended in his paper published in this journal on January 20, 1877. The birth-rates for the different districts embraced by the combined sanitary authority varied between 41·5 in Westbury, and 25·6 per 1,000 population in Tetbury urban district. The death-rates per 1,000 population were as follows:—In Westbury rural, 21·0; Westbury urban, 13·1; Newnham, only 11·7; Awre, 18·6; Cirencester rural, 16·3; Cirencester urban, 18·8; Chipping Sudbury, 17·1; Thornbury, 13·9; Chepstow, 17 6; Dursley, 20·8; Gloucester, 16·3; Tetbury rural, 13·0; Tetbury urban, 15·3. Scarlatina prevailed chiefly in Westbury rural, raising its death-rate rather considerably.

CARLISLE.—Dr. Elliot reports that the death-rate of the city in the week ending June 30 was 17 per 1,000 per annum. In the corresponding week last year there were 14 deaths, and the rate was 23 per 1,000 per annum. His annual report contains a comparison of the state of the public health during the years 1874, 1875, and 1876, and especially as regards the prevalence of zymotic or preventable diseases. In 1874 the deaths from typhus and scarlatina were 275—very nearly two-thirds of the deaths from zymotic diseases, and nearly one-fourth of deaths from all causes in that really unfortunate year. In 1875 there were from scarlet fever 26 deaths, of which 18 were in the first quarter; and in 1876 the deaths from scarlatina were 2. Typhus numbered 97 in 1874, 29 in 1875, and 6 last year. The mortality from all causes has also largely diminished. The number of deaths from all causes in 1874 was 1,055, in 1875 it was 934, and in 1876 it was 800; showing a diminution from each year to the next of more than a hundred deaths, and this is most evident in the case of zymotic diseases, the number in each year respectively being 399, 222, and 131. The periodical improvement per quarter in the rates per 1,000 is equally gratifying—the rates during each of the last three periods of last year being 19·5, 21, and 20, which is considerably better than the national average, and especially good in an urban population.

ROCHDALE.—Dr. Wilson has made up his report to March 31, so that it is not strictly comparable with those of other medical officers, which is to be regretted. He gives the death-rates from all causes, and seven zymotic diseases in eight other towns, which show that Rochdale has a lower rate than any, except Halifax, being about 23, whilst those of Ashton, Preston, and Wigan were above 30 per 1,000 population. The birth-rate was 35·4 per 1,000, and the deaths of children under one year, 166 per 1,000 births, which is low for a manufacturing town. A very severe and fatal epidemic of measles and a slighter one of scarlet fever caused a large proportion of the deaths from zymotic diseases. There were thirty persons attacked with small-pox, of whom twenty-seven were vaccinated, and all recovered, whilst out of three unvaccinated one died. Dr. Wilson acknowledges the courtesy of his medical brethren in giving him notice of infectious diseases, and paid a large number of visits to these cases. He also reported adversely on the condition of most of the dairy farms and slaughter-houses, and favourably on the common lodging-houses. He mentions a fine of *2s. 6d.* inflicted on a person exposing infected clothing, which indicates a want of support by the magistrates of the town.

Law Reports.

COMPENSATION FOR DRAIN RIGHTS.

AT an arbitration at Bodmin between Mr. Mudge, of Paignton, and the Bodmin Sanitary Authority, Mr. Mudge claimed damages of 100*l.*, as trustee on behalf of his son (who owns property here), in compensation for depreciation of the value of the property in consequence of a drain running through the same. A claim had been presented to the Town Council on several occasions, and the members at length agreed to pay a compensation of 5*l.*, as the work had been taken through the land without consulting Mr. Mudge through inadvertence, but it was ultimately decided to carry the affair to arbitration. No decision has yet been arrived at.

A LIGHT AND AIR CASE.

V.C. MALINS has had before him the case of Rothwell *v.* The Commissioners of Baths and Washhouses of St. Pancras. This was an action by the plaintiff, the owner of certain ground in Market Street, St. Pancras, claiming an injunction to restrain the Commissioners of Baths and Washhouses of St. Pancras from continuing to build upon a piece of land any buildings so as to obstruct or interfere with the access of light and air to which the plaintiff was entitled to the ancient windows in the plaintiff's houses as they formerly stood before they were pulled down to be reconstructed. The Vice-Chancellor refused the injunction.

REFUSING TO SELL FOR THE PURPOSES OF THE FOOD ACT.

J. USHER, druggist, Belfast, was charged with having refused to sell for the purpose of analysis sulphate of quinine, the same being on sale by retail on the premises. The sub-sanitary officer stated that when he went to defendant's shop he asked for a drachm of sulphate of quinine. It was exposed for sale on the premises. When the defendant had labelled the article, witness threw down a half-sovereign on the counter. Defendant said he had not change; and witness went out next door, got the change, and tendered the defendant half-a-crown. Witness then told him that he wanted it for analysis, whereupon the defendant snatched the sulphate of quinine and threw back the money. Defendant said, 'You are done now;' and witness told him he was liable to be summoned for refusing to sell the article. It was urged in defence that when this man went to defendant's premises he did not announce himself as a sub-sanitary officer, and did not ask for the drug for analysis. The defendant stated that when the complainant came into the shop he had the collar of his coat up, so that the letters 'S.S.O.' on the collar could not be seen. The complainant said that it was a wet day, and he had his coat collar turned up. The magistrate was of opinion that a distinct refusal had been proved. Having regard to the fourth section, the mixer of drugs was dealt with very severely—the penalty being 50*l.* The sale of adulterated drugs was one of the worst offences a man could commit. Although this case was the first under the Act, he thought it a bad one, and he would inflict the full penalty (10*l.*) for refusing to sell.

RIGHTS OF COMMON.

THE Master of the Rolls has had before him the case of Hartopp *v.* May, an action by Sir J. Hartopp, Lord of the Manor of Banstead, to restrain the defendant from pulling down certain fences erected by the plaintiff on Banstead Downs. The defendant, by his statement of defence, claimed certain rights of common over the Downs, amongst others a right to feed sheep without stint, and a right to feed ducks, geese, and such like birds; and alleged that the fences erected by the plaintiff interfered with his rights. The plaintiff demurred to the statement of defence. The Master of the Rolls said that there could not be a right to feed sheep without stint—it must be limited in some way; and the alleged right to feed ducks, geese, and such like birds was too indefinite. He therefore allowed the demurrer with costs, but gave the defendant leave to amend.

BREACH OF THE COMMON LODGING HOUSES ACT.

J. WHITEWAY, 38 Church Street, Lambeth, was summoned by Inspector Wallace, an officer appointed to carry out the provisions of the Common Lodging House Act, for keeping lodgers in a room unfit for habitation. Sergeant Gillies said that by direction of Inspector Wallace he went to the defendant's house early on the morning of the 15th of last month, and in a small underground kitchen, not above five feet high, he found two men in bed. The room was in the daytime used for domestic purposes, and was in a very filthy state, quite unfit for habitation. Mr. Partridge asked whether the house was registered. Inspector Wallace replied that it was not, and could not be registered in that state. In fact, the rooms were filthy and dilapidated. The defendant's wife said that the kitchen was only used occasionally. Mr. Partridge inflicted a penalty of 21*s.* and costs, or twenty-one days.

TAILORS AND SMALL-POX.

AT Marlborough Street, J. Nagle, journeyman tailor, was summoned to show cause why he should not be committed to prison for failing to pay 12*s.* 6*d.*, adjudged to be paid by him to Mr. Long, tailor, New Burlington Street, under the provisions of the Act of 1875. Mr. E. Lewis, for the defendant, asked that the case should be re-heard. A decision had been given in the absence of the defendant, and there was a question of vital importance to the public health connected with it. The defendant was summoned for not making a coat, for which he had been paid in advance, the fact being that at the time the coat was sent to him he had two children lying dangerously ill with an infectious disease in the only room occupied by him for living and working, in a house in Green's Court. One child had since died; the other was still ill. He was prepared to prove what he had stated. Mr. Longstaffe said he was instructed to give an emphatic denial to the statement, and, further, he objected to the case being re-heard. Mr. Lewis repeated he was prepared with witnesses to prove his statement. Mr. Newton decided that the application came too late, and he could not now re-hear the case. Defendant did not appear to the summons. There must be an order for immediate payment.

DESTRUCTION OF FISH BY LEAD MINES.

MR. J. LLOYD writes from Huntington Court, Hereford: 'Allow me to call public attention to the fact that this fine salmon river is being yearly more and more injured by the poisonous refuse from the lead mines established near its source at Plinlimmon. Year by year the fish are killed off lower down its course. First the river became tenantless of fish-life as far as Llangwrig, then down to Rhayader, and this last week thousands of fish have been killed for several miles below Rhayader down to the confluence of the tributary, the Elan. Fortunately the inflowing water of this stream diluted the poisoned volume of the Wye proper, and the mischief was checked at that point. As it is, fish-life is scarce in the Wye for several miles below the junction of the Elan, and at our meeting last Wednesday the conservators were startled to hear that dead and dying fish had been picked up, simultaneously with those found near Rhayader, down as low as Builth, or a distance of 35 miles from the lead-mines. This gradual extension downwards of the poisoning process seems to foreshadow the destruction of this river at no distant date unless timely and vigorous measures to arrest the evil are adopted. The withering of the leading branch of a tree is no uncertain sign of its early decay. The nation has few salmon rivers left, and would not, I think, willingly assent to the destruction of one of the finest of those, the Wye.'

ADULTERATION CASES AT BRADFORD.

AT the Bradford court, Chief Inspector Booker has summoned several persons for selling adulterated articles. Mr. G. H. Isitt, grocer, and others, were severally charged with selling preserved peas which were coloured with copper, whereby the peas were rendered injurious to health. Mr. Rimmington, the borough analyst, proved that in one sample of peas he found 0·84 grains of oxide of copper in one pound weight, which would be equivalent to 1¼ grains of sulphate of copper. In the second sample there were 0·784 grains of oxide of copper to one pound, equal to 2¼ grains sulphate of copper, and in the third sample, that from Mitchell's, he found 0·77 grains of oxide of copper to the pound, equal to 2 grains of sulphate of copper. Mr. Terry, surgeon, stated that if persons took copper in that quantity it would be injurious to health, as the presence of copper was a great irritant to the stomach and throat. The magistrates considered the cases proved, and the defendants were fined 20*s.* each, with 3*l.* 11*s.* each costs in addition. Cases were next heard of selling sweet spirits of nitre contrary to the provisions contained in Section 6 of the Act. Mr. Rimmington's evidence was supported by Dr. Paul, London, who illustrated in court by a simple experiment how to detect adulteration in the case of sweet spirits of nitre. The magistrates inflicted similar fines, with the like costs, in each case.

BABY FARMING.

MARGARET OWEN, of 31 Draper's Place, was summoned on behalf of the Metropolitan Board of Works for having retained and received for hire or reward more than one infant (two infants) under the age of one year, for the purpose of nursing or maintaining them apart from their parents for a longer period than twenty-four hours, in an unregistered house, contrary to the Infant Life Protection Act. Mr. Napier stated that this was a very bad case, and even if the defendant had applied for a licence it would not have been granted, owing to the wretched condition in which her place was. Inspector Whiting deposed that he visited the house and found two children there under the age of one year. He visited the house four days later and saw the same children. The defendant told him that the infant Ernest Knight had been at nurse since three weeks old, and the child Charles Compton for three months, and that she received 5*s.* a week each for their maintenance. The house was not registered, and the kitchen in which the infants were found was quite unfit for a nursery, there being sometimes five or six people there. Mr. Lloyd Smith, medical officer, St. Pancras Board, said that the child Compton was brought to him on the 14th ult. It had been imperfectly nourished. He saw it two days afterwards, and he then remarked that it had been neglected. Mr. Hosack fined the defendant 40*s.* and 23*s.* costs, or one month's imprisonment. The defendant was removed in custody.

RIGHTS OF COMMON.

THE Master of the Rolls has had before him the case of *Baylis* v. *Tyssen Amhurst*, an action brought on behalf of other owners and occupiers of lands and tenements in

the parish of St. John, Hackney, against the defendant as owner of Lammas lands in Hackney Downs and other open spaces in the neighbourhood, to restrain him from enclosing any part of the Lammas lands, and from digging gravel and destroying the turf and herbage growing thereon. The plaintiffs alleged that they and their predecessors in title had from time immemorial enjoyed a right of pasturage upon the Lammas lands during the season between the removal of the crops in each year and the time of preparing the land for sowing or the shutting up of the land for grass crops in the next succeeding year. They also alleged that the commencement and close of the season were regulated by by-laws which anciently were made by the persons entitled to exercise the rights of pasture and the owners of the Lammas lands, and for many years past had been made by the homage of the Manor of Lords Hold. The defendant demurred, on the ground that the right claimed by the plaintiffs was not a right which could be maintained at law. The Master of the Rolls said that he knew of no such legal rights as those alleged by the plaintiffs; there must be some connection between the lands in respect of which the right was enjoyed and the right itself, and no such connection appeared on the pleadings. It was the duty of the pleader to state a legal right, and he should therefore allow the demurrer, giving the plaintiffs leave to amend their statement of claim.

BY-LAWS AS TO COMMONS.

AT Worship Street Mr. Hannay has had before him a batch of summonses taken out by the Metropolitan Board of Works against persons, for having contravened by-laws made for the regulation of Stoke Newington Common. Mr. Fry, for the board, said that he understood the facts were admitted, the offence charged being the turning out of cattle on the common without authority from the board. The defence, he understood, would be a question of right, and that question would be for the magistrate to determine. The question with regard to the Hackney commons was already a very vexed one, and there were several actions pending already before the Master of the Rolls. Mr. Fry read the by-law showing that cattle were not to be turned out without the authority of the Board of Works. Then there was, he said, a by-law of the lord of the manor as to his rights. Mr. Kimber urged that the question was the parishioners' rights, and he could prove them in the present case fully. A constable employed by the Metropolitan Board then gave evidence as to the cattle being on the common. In reply to Mr. Fry he said that when he spoke to some of the defendants as to their cattle being on the common, they said that they put them out because others did, being themselves parishioners. They claimed it as a right. Mr. Kimber thought this admission ousted the jurisdiction of the Court. Mr. Hannay thought so too. Some questions of right undoubtedly required to be strictly watched, but here the claim appeared to be set up at the time. Mr. Fry said he should ask that the summonses might be ordered to stand over, not dismissed, as otherwise all Hackney would be turning out on the commons. Mr. Hannay said he would hear some evidence as to the rights. H. Ansell deposed that he had lived in the parish thirty-one years, and his father and grandfather before him. Had always turned out his cattle, horses, and cows on the common and the marsh. The cattle were always marked at Homerton pound on behalf of the lord of the manor, the fee for the marsh being 1*s.* and for the common 4*d.* After similar evidence, Mr. Hannay thought the witnesses proved enough to show that a *bonâ fide* claim had been made, and the summonses would be dismissed.

DEFAULT BY A LOCAL BOARD.

V. C. MALINS has had before him the case of Sutton *v.* Barnet Local Board. The plaintiff is a farmer at Potteridge, and the action was brought for an injunction to restrain the Local Board from committing a nuisance by allowing the sewage of the district to flow into a stream running by the plaintiff's farm. A motion was now brought on, on behalf of the plaintiff, that Messrs. Byford, Farrington, Huggins, and Stevens, members of the Local Board, might stand committed to prison for breach of an undertaking to stop the flow of the sewage, and also that a commission of sequestration might issue against the estate of the defendants, the local board. An action for damages had been brought by the plaintiff against the defendants, which was tried at Hertford, and that action resulted in a verdict for the plaintiff, with 75*l.* damages, and costs. It was not now sought to enforce the commitment of the defendants, but only that they should be ordered to pay the costs. The motion was opposed, on the ground that in a case like this, where the defendants had been doing all in their power to remove the nuisance it was unjustifiable on the part of the plaintiff to ask that the four members of the Board should be committed, and that they ought not to be ordered to pay the costs. The Vice-Chancellor said that it was quite clear that the board had no intention whatever of acting contumaciously; but on the contrary, that they had done all they could to abate the nuisance. There was, however, no doubt upon the evidence that the steps they had taken were not effectual, although the nuisance might in some degree have been abated. Under those circumstances the defendants ought never to have allowed this case to go on, but should have submitted and paid the costs, the only object of the plaintiff being to enforce the undertaking already given. If this motion had been merely for a sequestration, it would have been a matter of course; but the plaintiff, not satisfied with that, moved also for the committal of the personal members of the Board who authorised the undertaking. That portion of the application was wholly unnecessary and unjustifiable; and his lordship agreed with the counsel for the defendants in thinking that several clauses in the Act were intended expressly to protect the persons forming the different boards from any personal liability. Under all the circumstances he should order the Local Board to pay the costs so far as regarded the sequestration, but he should not give costs against the individual members of the board in respect of the motion to commit.

BREACH OF THE QUARANTINE ACT.

LINDSAY *v.* ABBOTT was a *Qui Tam* action to recover penalties under the Quarantine Act, 6th George IV., cap. 78. The plaintiff was chief officer of Customs at North Shields, and the defendant the master of a ship which arrived in the Tyne from Carthagena. In pursuance of the Quarantine Acts and the Orders in Council issued under them, two of the plaintiff's officers went off to the vessel and put to the master the following questions, to which he gave the following answers:—'1. Where are you from?—Aguilas. 2. Are you all well on board?—Yes. 3. Have you a clean bill of health signed by the Consul?—Yes. 4. Produce it.—Produced. 5. Have you had any sickness or death on the voyage?—One man, who was put on board by the Consul after being in the hospital, suffering from fever and ague. 6. Is he well now?—He has periodical attacks. 7. That is not infectious?—No.' The officers being satisfied with the above answers allowed the vessel to proceed into the Tyne dock, and the crew were discharged. The next morning one of them was found in the house of a man named Waggatt in such a condition that Waggatt sent for the doctor, and the doctor at once pronounced him to be suffering from malignant small-pox, and he afterwards died. In these circumstances the action was brought to recover the penalty of 200*l.* for refusing to answer, or for answering falsely, the questions put by the officers. For the defence it was contended that during the voyage there had been nothing to raise in the master's mind a suspicion that the man was suffering from small-pox. The English Consul at Carthagena had sent him on board; he had slept in the same room with three other men during the time, and had been about on the deck. The defendant had noticed a slight rash on the

man, but had given him a dose of Epsom salts, and it had disappeared, but there was nothing else to make the captain think that the man had small-pox. The defendant said further that he did mention to the officers the fact that there had been a rash and had asked them to look at him for themselves; but this was disputed. It was therefore argued that the defendant had neither 'refused to answer' nor 'answered falsely' the questions put. His lordship having summed up, left the following questions to the jury:—1. Did the defendant intentionally conceal the fact that the man was labouring under some eruptive disorder? 2. Ought he, as a reasonable man, to have known that the eruption he had noticed three days before was a fact that he ought to have reported? 3. If so, did he intentionally conceal it? The jury at once answered the first two questions in the affirmative, and returned a verdict for the plaintiff for 200*l.*

POWERS OF GAS COMPANIES.

THE recent case of *Thompson* v. *Sunderland Gas Company* raised important questions as to the construction of the Gas Clauses Act of 1847. The plaintiffs were shipbuilders at Southwick, near Sunderland, and the defendants a gas company incorporated by Act of Parliament, and who supplied gas to a district which included Southwick. Through the plaintiff's premises ran a public footroad and a private cart and carriage way, used only by the plaintiffs and the owners of the adjoining property, and under the road and the way were several arches which belonged to the plaintiffs, and were used as store rooms. By the Gas Works Clauses Act, incorporated by the defendants' Act, it is provided that the undertakers may open and break up any sewers, drains, or tunnels within or under streets, and lay down pipes, etc., 'doing as little damage as may be in the execution of the powers hereby granted, and making compensation for any damage done in the execution of such powers.' But the following section is to this effect:—Provided nothing shall empower companies to lay down or place any pipe or other works 'into, through, or against any building, or in any land, not dedicated to public use' without the consent of the owners or occupiers. In excavating the road to lay down their pipes the gas company broke through the brickwork of the arches, so that the space in which the plaintiffs stored their goods became filled with rubbish, and useless for that purpose. On this the plaintiffs brought an action against the company, which was tried at the Durham Assizes, when the jury found that the road over the arches was a highway, and that the defendants had not constructed their works negligently, and they assessed the damage done to the arches at 25*l.* The learned judge then directed judgment to be entered for the defendants, on which the plaintiffs appealed unsuccessfully to the Exchequer Division, and then to the Court of Appeal.

The Court were of opinion that the arches in question constituted a building within the Act. The history of the arches was not very clear; they may have been built to support the road, or the owner of the soil, when the roads was made, may have thought they would be convenient to him. They were useful and had been used, and the Court could not see why they were not buildings. The word referred, moreover, to buildings below the soil, as well as those built upon the soil. Many important parts of a house were frequently extended beneath a road, such as the cellars for wine or coals, and it could not be supposed, as the defendants contended, that a gas company were empowered to interfere with these as they pleased. If the arches had been made solely to support the street, it might be a question as to how far they might be considered a building within the meaning of the Act; but here the arches had apparently been used as long as the road itself by the owners of the soil. There was no Parliamentary power enabling the defendants to interfere with these arches without the consent of the owner, and judgment, therefore, would be entered against them.

DEFINITION OF WATERCOURSE.

THE Master of the Rolls and Lords Justices have had before them the case of Taylor *v.* The Corporation of St. Helen's, an appeal from a decision of Mr. Little, Q.C., Vice-Chancellor of the Lancaster Chancery Court, and it raised a question of some interest as to the meaning of the word 'watercourse' in a grant. An Act of Parliament was passed in 1843, incorporating the St. Helen's Waterworks Company for the purpose of supplying the town of St. Helen's with water. The Act empowered the company to agree with the owners of the lands, springs, and streams which they were thereby authorised to enter into, purchase, and use for the purposes of the waterworks, for the absolute purchase for a consideration in money of any such lands, springs, and streams, and provided that such consideration might be in the form of a perpetual annual rentcharge in lieu of a sum in gross. By a deed poll under this Act, dated October 28, 1844, Mr. Samuel Taylor, lord of the manor, in consideration of a rent-charge, granted to the company, their successors, and assigns, "All and singular the waterworks, dams, and reservoirs and intended reservoirs in or upon the lands of Taylor, in Eccleston, which watercourses, dams, and reservoirs, and intended reservoirs were described in the plan annexed to the deed, and were therein coloured blue (which plan was to form and be deemed a component part of the deed), and also the several springs or streams of water flowing into or feeding the said watercourses, dams, and reservoirs, as indicated in the said plan. The undertaking and the powers of the company became afterwards vested in the Corporation of St. Helen's. At one point of the principal watercourse granted by the deed of October, 1844, where it runs through a covered channel or culvert, there was what is called a 'throttle,' that is to say, for a distance of about forty feet the size of the channel was contracted by its floor being suddenly raised in height twenty-eight inches, the result being that the flow of the water was obstructed and the level rendered higher at the upper part of the watercourse, so that more water found its way in time of flood, by means of the weirs and channels leading therefrom into the Mere and the Corn Mill Dam, than would have been the case if the throttle had not existed. The Corporation in the year 1875 removed the throttle and constructed in place of it an enlarged culvert of uniform gradient. The object of this suit was to restrain the Corporation from doing this, and to compel them to restore the throttle. The Vice-Chancellor granted a perpetual injunction to restrain the Corporation from enlarging the size or altering the level of the watercourse, and ordered them to restore the throttle. The Corporation appealed.

The Master of the Rolls said that the question was as to the true construction of the grant in the deed of October, 1844. The words must be construed according to their ordinary meaning, unless the context showed that a different meaning ought to be given to them, and the old maxim, that if there were any difficulty or obscurity in the construction of a grant, it was to read most strongly against the grantor, has at the present day very little weight. The grant of a watercourse might mean one of three things. It might mean a grant of the easement or right to the flow or running of the water, or a grant of the channel containing the water, or a grant of the land over which the water flowed. Which of these three meanings was to be adopted must depend on the context. In the present case his Lordship thought that the grant was of a corporeal hereditament, and that it meant the channel, pipe, or drain which contained the water, and the water contained in it; and if there were nothing else in the deed the grantees would be entitled to the channel and the water coming into it by ordinary natural means. Of course, Mr. Taylor could not grant the water which flowed into the watercourse from land not his own, for that water was not his to grant; but by the grant of the watercourse he granted any water which flowed into it from off his own land. Then he also granted springs of water, which must mean his own springs. A spring was a definite source of water existing in nature, and

it might be above or below the ground; a stream was also something running in a defined course, and Mr. Taylor granted also the streams of water on his own land. That was the extent of the grant. The defendants claimed to be entitled to, not merely the water in the watercourse and the springs and streams of water, but to all the water which could by any possibility get from Mr. Taylor's land into the watercourse. His Lordship thought that the grant extended only to such water as was granted because it was in the watercourse. If a grant was made of vessels containing fluid, the grantee only got the fluid because it was in the vessel. He had no right to enlarge the vessel for the purpose of getting more fluid into it. If it could be shown that all the water on Mr. Taylor's land had been granted independently of its being incidental to the grant of the watercourse, that would imply a reasonable way of getting it, and would imply a right to enlarge the watercourse. But that was not the grant in the present case. The result was that the defendants had no right to enlarge the existing watercourse, and the decree of the Vice-Chancellor must be affirmed.

Review.

Sea-Air and Sea-Bathing. A Practical Guide for the Use of Visitors at the Sea-Side. By CHARLES PARSONS, M.D. Honorary Surgeon to the Dover Convalescent Home. (J. and A. Churchill, 1877, pp. 116.)

WE must confess to having derived considerable instruction and satisfaction from the perusal of this little work. Even to the professional mind, going to the sea-side and bathing in the sea are matters not calling for deliberate thought, but are done in a hap-hazard sort of a way, with a vague idea of some general cautions of a very elementary character. Dr. Parsons has done well in complying with the request of his publishers to prepare such a work as this. His extensive experience enables him to make his little work very complete, and his deliberate choice of ordinary rather than technical terms is a wise one, and will enable a larger number of persons to profit by his work than would have been the case had he adopted the other plan. He commences by a general consideration of the effects of sea-bathing on the system, and explains the causes of the exhilaration brought about thereby. Then follow some general directions. While admitting that for the robust a dip in winter may not be injurious, he insists that for those who are not strong sea-bathing should be restricted to the summer season, from June to September, and should not be carried beyond October at the latest. All beginners should commence in summer. For the strong, too, early morning bathing is not objectionable, but for ordinary visitors the best time is two or three hours after breakfast. He is also strongly of the opinion that no good accrues from bathing oftener than once; he even thinks that for many it is well to bathe only on alternate days. Wading about in shallow water he strongly condemns. As to the question of bathing when heated, he thinks that there is no danger, provided that the body be not overfatigued or exhausted by prolonged exercise. He makes some excellent remarks on the duration of the bath, and the reaction after it. 'As a general rule, from which no deviation should be allowed, all sea-bathing, to be beneficial, should terminate before the stage of chilliness comes on, *i.e.* before the animal heat has been lowered below the proper degree, and whilst the primary reactive glow continues in force; always remembering the colder the water the more powerful and depressing its effects, and though the reaction be more speedy and active, its duration is shorter. The temperature of the water, therefore, is one factor to be considered in determining the duration of the bath. Another important guide is the character of the pulse, which enables one to estimate with sufficient accuracy the amount of reactive power possessed by the individual. A vigorous circulation and a full pulse imply energetic reaction; but a weak and languid pulse, feeble reaction. It is clear, therefore, that what would be proper in the one case would be injurious in the other.' To many persons these remarks will be of great service, and especially to those who know little about sea-bathing, except that it is a fashionable practice, and that they enjoy it and its surroundings. Then the writer considers warm sea-water baths, and minor forms of baths and ablutions, which are indicated in the case of children and invalids, where the open sea bath is unsuitable.

In the fifth chapter, sea-air is considered. Its composition, its high proportion of oxygen in an active form, its comparative uniformity of temperature, its humidity, and its impregnation with saline particles are described and explained. In the following chapter the various forms of maladies and disturbances to which a residence at the sea-side combined with bathing may give rise are described. Cases of overwork demand caution, and directions for the guidance of such bathers are detailed. Children suffering from strumous manifestations—as rickets, etc.—also require care in their management at the seaside; and Dr. Parsons points out how they may get the maximum of good and avoid sources of danger very clearly. Timid children should not be taken to the open sea, where they are often much frightened, but should have a sea-water bath at home. In catarrhal affections, the bath should be brief; and in cases of chronic bronchitis, much good arises from respiring the atomised spray of the waves.

A chapter is devoted to the question of, When is sea-bathing injurious? Speaking of cases of death following immersion in the sea. Dr. Parsons says, 'The wonder is, however, not that these accidents occur at all, but that they do not happen more frequently considering the vast amount of indiscriminate bathing which goes on throughout the season in every watering-place around our coast.' For infants and the aged, the sea-bath is unsuitable. The remarks about sufferers from heart-disease and consumption are sensible. Chapter VIII. deals with the ailments and discomforts which sometimes accompany a course of sea-bathing; while the final chapter deals with the question of general hygiene at the seaside. The dietary, the amount of exercise, the kinds of clothing, the amount of rest and sleep requisite are all carefully considered. While insisting on the necessity for a sufficiency of sleep, Dr. Parsons says nothing about going to bed after a bath, a subject on which we were anxious to have some information. There are many little points which are omitted, or on which the information is rather meagre, but we are not disposed to cavil with these defects, which can be remedied in a succeeding edition, but rather to express our satisfaction with this unpretending little work. It should be read by everyone visiting the seaside with the intention of bathing.

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

SEWER VENTILATION.

(*To the Editor of the* SANITARY RECORD.)

SIR,—I am very glad to see the article from the *Builder* republished by you (page 362).

Sanitary engineering in America is so new, and we depend so largely upon information which we get from abroad, that I had half feared my original conviction was not soundly based, and was beginning to doubt under the influences of the many communications I have seen in your columns, whether it were not after all, best to give up the use of the soil-pipe as a means for the ventilation of street sewers, and to adopt the more recently suggested system of disconnecting the house-drain entirely.

The *Builder's* article is so entirely in accordance with

own ideas on the subject, that I trust Mr. Field, Mr. Buchan, and others, will either endorse it, or adduce some better reason than I have thus far seen for disregarding its teaching.

There should be no difficulty in making a cast iron soil-pipe so tight, with properly secured joints, that there can be no possibility of the leakage of its contained air into the house. It seems to me that the universal adoption of the soil-pipe method of sewer ventilation must necessarily lead to a perfect ventilation of the sewer itself, and to the consequent counteraction of its injurious influences; and that the sewer so ventilated will be a perfectly satisfactory source from which to draw air for the ventilation of the private drain and soil-pipe. This system is certainly the simplest, and why it is not the best, nothing that I have yet read on the subject has shown.

GEORGE E. WARING, jun.,
Newport, R.I., U.S.A.

PATENT SANITATION.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Mr. Phillips, at page 47, states that I wrote 'rashly' when I applied the words 'inferior modification' to his illustration Fig. 2, page 14. Now, I beg leave to show that I was quite justified in doing so. In his drawing the fresh air has to turn a sharp or square corner at the top of the ventilating trap before it enters the horizontal drain pipe; in my patent trap no such sharp corner exists there, said corner being cut off about 3 in. or more back, according to the size of the trap. This point is of importance, especially in a ventilating trap. Further, the outlet at 'B,' of Mr. Phillips' sketch is also bad, as it shows a quick contraction, which in practice would tend to cause the trap to be easily choked up. These two 'inferior modifications' are sufficient to show that Mr. Phillips is not quite so well posted up in ventilating traps as he imagines.

W. P. BUCHAN.

124A, Renfield Street, Glasgow.

Sanitary Inventions.

PAINT AND DISTEMPER FROM A SANITARY POINT OF VIEW.

As sanitary science advances and becomes more and more popular, so in proportion, we venture to predict, will the use of paper-hangings become less and less general. There are four serious objections to their use: First, that their surface collects and retains dust and impurities, and that cleansing is generally difficult and often impossible. Secondly, that layer after layer is frequently applied without stripping off the old paper, thereby often causing an offensive odour. Thirdly, that the poisonous arsenite of copper is much used in their colouring. Fourthly, that they form a convenient harbour for vermin, and we might almost add as a fifth that they too frequently conceal the miserable work that is called plastering by the speculating builder.

Many paper-hangings remain on walls for seven or ten years, some much longer, and we cannot use a milder adjective than 'disgusting' to express our views as to any part of an inhabited room not being thoroughly cleansed very many times during such a period. Not long since a gentleman who had always noticed an offensive smell in his house, but was unable to account for it, had some of his family laid up with typhoid fever. After their recovery he had the walls stripped; and in one room it was found that there were twenty-five layers of paper one over the other; thus were the accumulated filth, and a mass of decomposed paste carefully stored.

Arsenic, although not nearly so much used as formerly, is still extensively employed. We know of one firm in Lancashire who, not long since, were manufacturing at least four tons per week of emerald green. It is generally supposed that arsenic only exists in bright green papers; this is not the case; it is also employed in the manufacture of some of the most beautiful browns. Where arsenical poisoning has occurred from this cause, it is true that the very bright green papers have commonly been found in the walls; these, appealing to the taste of the cottager, are made very cheaply, the colour being floated on with potato-starch, and as this soon loses its adhesive properties the colour is free to float about in the air, to be taken on food, or otherwise absorbed into the system. Upon our fourth objection we do not think it necessary to enlarge. Many of our readers have doubtless had painful experience of its validity.

We unhesitatingly express our opinion that, *cæteris paribus*, a house with painted or distempered walls is more likely to be healthy than one with papered walls. Hitherto the objections to lead paint and distemper have been that the former is injurious to the health of the workmen, and that the white and delicate shades of colour are so soon affected by exposure to gas fumes, etc., and that distemper cannot be washed.

We have for some time had under observation the paints and washable distemper of the Silicate Paint Co., of Liverpool (London Office, 107, Cannon Street), but although they were strongly recommended to us we wished to have practical experience of them before introducing them to the notice of our readers. We are now in a position to state that the advantages claimed by the manufacturers for these materials are not overstated, and we fully expect that ere long they will entirely supersede lead paints and paperhangings.

The objections we have mentioned are not applicable to the paint and distemper of the Silicate Paint Co.; neither of them contain a particle of lead or other poison in any form, and therefore are not injurious to the workmen, the white and delicate shades are not affected in the slightest degree, even when exposed to the fumes of sulphuretted gas, and both are washable; they are easily applied and may be used plainly and cheaply enough to suit the workman's cottage or decoratively for the mansion. We strongly recommend the use of the washable distemper for the walls of bedrooms, feeling sure that any one who once uses it will never revert to paper hangings.

It was only last week that one of the Medical Journals commented on the papered walls in the New Victoria Dwellings Battersea, and referred to distemper as being 'cheaper, prettier, and more wholesome.'

We have seen a capital plan adopted at the dwellings erected by the Aylesbury Dairy Co., for their *employés*. Here the upper portion of the walls is distempered, the lower part having a dado of a darker shade of the Silicate Paint Co.'s new enamel paint, which is very hard, has a good glossy surface, is easily cleaned and looks as if varnished. We have seen nothing better adapted for workmen's dwellings, whether looked at from an æsthetic, economic, or sanitary point of view.

The enamel paint might advantageously be employed on floors as a border where parquetry would be too expensive. The practice of carpeting a room all over is objectionable as it harbours dirt. We should prefer, on sanitary grounds, to see all rooms with a wide border of flooring left round the carpet, even if only plain boarding, so that it might be frequently washed, and the carpet more often taken up and beaten. What is called the petrifying liquid of the Silicate Paint Co., is a preparation for the cure of damp walls, we have seen testimonials speaking highly as to the value of this material, but as we have not yet put it to any practical test we forbear for the present to say more about it, but shall probably refer to the subject again.

The walls of the offices of the Company, 107, Cannon Street, London, have been finished to show the application of the different processes, and the company invite the inspection of all who take an interest in these important questions.

LIME JUICE.

THE utility of lime-juice as a prophylactic of scurvy, has been, if possible, placed on a more authoritative basis than ever by the evidence adduced before the committee appointed to inquire into the causes of the outbreak of scurvy in the last Arctic expedition, under the command of Sir George Nares. Lieutenants May and Giffard, R.N., who were employed in sledge journeys, Surgeon Colam, Dr. Ninnis, Surgeon Toms, Dr. Lyall, Deputy Inspector-General Macdonald, M.D., F.R.S., Surgeon Major S. B. F. de Chaumont, Dr. Parry, F.R.S., Mr. George Bush, F.R.S., Dr. Buzzard, Mr. Harry Leach, Dr. Walter Dickson, Admiral Ommaney, F.R.S., C.B., Sir Alexander Armstrong, M.D., K.C.B., LL.D., F.R.S., amongst others of equal reputation, all gave the most unequivocal testimony to the value of lime-juice, both as an antiscorbutic and as a remedial agent when the disease has made its appearance. Dr. Buzzard, in his evidence, said that experience has shown that lime-juice in the absence of other forms of vegetable food, will prevent the occurrence of scurvy under circumstances where scurvy would have occurred without the addition of this antiscorbutic to the dietary, in consequence of its acting as a substitute for fresh vegetable food. The same authority stated that in the cure of scurvy the effects of lime-juice are of extraordinary rapidity, and that he has seen the condition of patients materially altered in a few hours by the administration of lime-juice. Dr. Macdonald believes that to the citric, malic, and tartaric acid contained in the lime-juice are due its antiscorbutic properties, an opinion shared by Dr. de Chaumont. Mr. Harry Leach, to whom we owe the Merchant Shipping Act of 1867, by which the quality of all lime-juice supplied to the navy was assured by legislation, is of opinion, however, that lime-juice possesses decidedly more antiscorbutic qualities than lemon-juice, because it contains more of the extractive matter For the last eight or nine years the Navy has been supplied with lime-juice and lime-juice only, and they are most particular that it should be guaranteed the produce of fresh limes, gathered in certain seasons of the year; but in the Mercantile Marine, lemon-juice is also permitted. This is due to the fact that at the time of the passing of the Merchant Shipping Act, there was no known source from which a regular supply of lime-juice of good quality and sufficient quantity could be obtained, hence lemon-juice had to be permitted; but now that the Montserrat Company's plantations are come to maturity, a regular supply of the finest lime-juice, pressed only from the ripe and sound fruit, can be guaranteed. It is therefore to be hoped that the Merchant Marine may participate in the immunity from scurvy which is enjoyed by the Royal Navy. Lime-juice is now also largely employed as a therapeutic agent in gout and rheumatism, many persons using it, diluted with water, as a beverage with their daily meals. For this purpose, too, it is adopted by many who object to consuming alcohol, and we may mention that at a sanitary banquet lately given in London, a celebrated surgeon and a well-known physician might have been seen to drink lime-juice mixed with water as their chosen beverage.

MOULE'S PATENT EARTH-CLOSET SYSTEM AT WIMBLEDON CAMP.

THIS means of disposing of and preventing nuisance from the excreta of large numbers of people has, during the past few years, been put to a severe test at the meetings of the National Rifle Association at Wimbledon.

For the first few years the water-closet system was tried, with the result, as might have been expected, of an intolerable nuisance arising from the various latrines and urinals. Though disinfectants of every description were in turn used it was found impossible to keep the places in anything like a satisfactory state. In this dilemma it was at last decided to experiment with Moule's Dry Earth system. So satisfactory has its working been, that for ten years the company has, at the request of the council of the Association, provided the necessary accommodation.

Believing that such a test would severely try the capacity of the dry earth plan, we visited the camp on the last day of the meeting, especially choosing this day as likely to show the best or worst results.

The latrines for soldiers, police, volunteers, and the general public were visited. As the largest and most frequented of the places will serve as a fair sample of the others, a short description of it will apply to them also.

To begin with the ground plan. A pit, some five feet deep and lined throughout with brick, forms the receptacle for the excreta. This lining with brick is not essential to the proper working of the dry earth system, as one latrine had a pit simply dug in the earth. Accommodation is here provided in the shape of sixteen urinals and twenty-two closets.

The closets have a self-acting arrangement, by which the necessary quantity of earth is discharged. The urinals are in direct communication with the earth in the pit, its surface being some five feet below the level of the ground, and, to start with, having about two inches of dry coarsely-powdered earth sprinkled over it. The description of earth used is a matter of little importance, provided it is dry and of an absorbent nature. Between the closets and urinals, which are arranged in parallel lines, is a passage about three feet wide, providing for the replenishing of the hoppers with earth when required, a supply of the material being provided at each end of the passage. Attention to the hoppers about once a day, and at the same time a levelling of the surface below each closet, are the only precautions required. In the case of the urinals a fresh supply of earth about two inches deep is laid down at the same time.

By these simple means the most satisfactory results have been obtained. Though we visited each of the places in turn, and the pits were all nearly filled, not only was there no odour from the outside of any of the buildings, but even inside, standing over the pits, an entire absence of smell was a remarkable and convincing proof of the efficiency of the dry earth system.

For occasional assemblages of large numbers of people this system seems to offer the readiest, most efficient, and economical means of providing the necessary accommodation. It must be borne in mind that the earth is, after only once using, impregnated with a valuable fertilising material. Where dry earth is not plentiful the original supply may be dried and used time after time, losing but little of its deodorising quality in consequence.

Though the same earth has been used for the sake of experiment, as often as twenty times, and still retained its virtue, it is not advisable to make it serve more than three or four times. Earth thus used forms a manure equal to guano, and is moreover produced at little or no cost compared with manures of equal fertilising power. The dry earth system is peculiarly adapted for use in rural districts, small towns, and in all places where the water supply is deficient, and the necessary material for use in the earth closets can be obtained at an economical rate.

All who reside in country places must have experienced the almost intolerable nuisance arising from the primitive arrangements for the disposal of solid and liquid excreta. To all such we would recommend a short trial of the dry earth system, which, if adopted, would add to the comfort and health of the neighbourhood.

An objection sometimes raised to the system is that it is not suited for dealing with liquid refuse, such as slops from the kitchen and household generally.

To complete the arrangements for disposing of the waste from ordinary dwellings or large institutions, special arrangements for treating liquids have been successfully made.

In the case of one large public institution, the various sinks and slop closets were made to communicate with a Field's flush tank, holding forty gallons, and discharging its contents when filled. In connection with this was a pipe

communicating by a system of sub-irrigation with every part of the kitchen garden of the institution. The pipes were of the ordinary unglazed description, but perforated to allow of the more ready escape of their contents. This garden soon produced better crops than had been before obtained, and looked green and flourishing at times when others were parched for want of moisture.

In reference to the Wimbledon arrangements, it is but just to state that no especial preparations had been made for our visit to inspect the plan adopted by Moule's company. On making our business known to their manager, he at once expressed his willingness to accompany us, and show the working of the apparatus in use throughout the camp.

ALLEN'S PORTABLE TURKISH HOT-AIR AND VAPOUR BATH.

THE value of the Turkish bath as a therapeutic agent in rheumatic, catarrhal, and in fact all diseases in which a copious action of the skin is necessary, is now thoroughly established. It is not, however, always practicable to send a patient to the Turkish bath, nor can a healthy person desiring to enjoy one of these balneological luxuries always spare the time to do so during the period the public baths are available. In these and similar cases, Messrs. Allen's portable bath will be found a luxury, as well as a valuable remedial resource. The hot-air, or hot-air and vapour, are generated in this simple apparatus with the greatest ease and at the small cost of 3*d.* for the methylated spirit required to obtain the desired heat. By a simple arrangement, the vapour can be conducted into the bed of the patient, if necessary, or it can be diffused around the person taking the bath, in a sitting position, by the facile expedient of placing a blanket round him so as the ends reach the ground. As an agent of cleanliness no less than of resource in illness, one of these portable Turkish baths should be in every house, a measure which is rendered universally practicable by their moderate price and extreme compactness.

NORTON'S PATENT 'ABYSSINIAN' TUBE WELLS.

OUR attention has been drawn to these very efficient and in every respect admirable wells. They present many obvious advantages over the old-fashioned dug-wells, in the impossibility of contamination from surface-drainage and leakage of cesspools, etc., so frequently the cause of zymotic disease in places where the supply of potable water is obtained from wells. As the subject of pure water-supply is of interest to our readers, and the tube wells in question appear to afford a most economical and satisfactory means of obtaining it, we intend devoting some space in an early issue to a report of results obtained where the system has been tried.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

BATTERBURY, George Henry, M.B., Univ. Lond., M.R.C.S. Eng., has been appointed Medical Officer of Health for the No. 1 Sub-District of the Wimborne and Cranborne Rural Sanitary District, vice Druitt, resigned.

DYER, Samuel Sumner. M.D. Univ. St. And., L.R.C.P. Lond., has been re-appointed Medical Officer of Health for the Ringwood Rural Sanitary District for one year.

FAIRLEY, Thomas, F.C.S., has been appointed Public Analyst for Wakefield for one year: 12*s.* 6*d.* per analysis, and 21*s.* when required to give evidence in support of an information.

GREEN, Mr. (of Mere Side), has been appointed Inspector of Nuisances for the Ellesmere Rural Sanitary District.

HILL, Alfred Bostock, M.D. Univ. Giessen, L.R.C.P. Edin., has been appointed Public Analyst for Stratford-on-Avon.

JACKSON, Mr. W., has been appointed Surveyor and Collector to the St. Neots Local Board and Urban Sanitary Authority, Huntingdonshire, vice Martin, at 40*l.* for one year.

MASON, George, M.R.C.S. Eng., L.S.A. Lond., has been re-appointed Medical Officer of Health for the Wisbech Urban Sanitary District, at 40*l.* for one year.

PARKER, Mr. E. M. has been appointed Inspector of Nuisances for the Belper Urban Sanitary District at 30*l.* for one year.

Ross, Mr. John, has been appointed Inspector of Nuisances for the Newtown and Llanidloes Rural Sanitary District, Montgomeryshire, vice Brodie, resigned: 120*l.* for one year.

VACANCIES.

ASHFORD LOCAL BOARD AND URBAN SANITARY AUTHORITY, Kent. Surveyor and Inspector of Nuisances. Application, 28th instant, to F. Hughes Hallett, Clerk.

BAILDON LOCAL BOARD AND URBAN SANITARY AUTHORITY, Yorkshire. Collector. Application, August 1, to Jeremiah Brooke, Clerk.

BELPER URBAN SANITARY DISTRICT, Derbyshire. Medical Officer of Health: 25*l.* per ann.

BRIDPORT, Borough of, and Urban Sanitary District. Inspector of Nuisances.

DRONFIELD URBAN SANITARY DISTRICT Derbyshire. Medical Officer of Health.

FARINGDON RURAL SANITARY DISTRICT, Berks. Medical Officer of Health for the Shrivenham Sub-District. Application, 31st instant, to George J. Haines, Clerk to the Authority.

FENTON LOCAL BOARD AND URBAN SANITARY AUTHORITY, Staffordshire. Collector and Sub-Sanitary Inspector: 100*l.* per ann. Application, 30th instant, to Charles Adderley, Clerk to the Authority.

HANDSWORTH LOCAL BOARD AND URBAN SANITARY AUTHORITY, Staffordshire. Surveyor: 300*l.* per ann. Application, August 13, to Henry Ward, Clerk, Church Street, West Bromwich.

HARDINGSTONE LOCAL BOARD AND URBAN SANITARY AUTHORITY, Northamptonshire. Collector for the St. James's End District.

NEWBOLD AND DUNSTON URBAN SANITARY DISTRICT, Derbyshire. Inspector of Nuisances: 20*l.* per ann. Application, Aug. 3, to J. G. Young, Clerk to the Authority.

RADNORSHIRE. Public Analyst: 21*s.* per analysis and travelling expenses when attending to give evidence. Application to the Clerk of the Peace, Presteign.

SANITARY PATENTS.

2100. Improvements in the means of and apparatus for ventilating ships by and for utilising steam in a condensed form for drinking or other purposes. Henry Levinge, New Park, Athlone, Ireland.

2257. An improved process of greening preserved vegetables and fruits. Alfred Charles Collineau and Michel Edmond Savigny, Boulevard St. Denis, Paris.

2270. Improvements in the preservation of animal food in a fresh state. William Morgan-Brown, Southampton Buildings, London. A communication from Edouard Georges, Paris.

2286. An improved fireplace or kitchen-range, specially adapted for artisans' and labourers' cottages and dwellings. Alexander Charles Smith, Dublin.

2289. Improvements in the means of and apparatus for ventilating carriages. Henry Carter and Charles Warren, Ipswich.

2375. An improved method for the preservation in its natural state of fresh animal food, such as beef, mutton, pork, and fish, and to prevent decay in hides and salted meats. John Taylor, Hope Street, Liverpool.

2545. Improvements in the method of treating sewage sludge. Edward Johnson, Morden Grove, Lewisham, and James Robey, Cumberland Street, Manchester.

ABSTRACTS OF SPECIFICATIONS.

4376. Blocks or inverts for drains and sewers. E. Brooke.

These are made with a projection at one end to fit into a recess in the next block, or with projections at both ends to fit into hollows in other blocks.

4424. Receptacles for house sewage. S. S. Hellyer.

Water-closet basins are made with the bottoms curved to retain some water, and the outlet in front screened by the seat, and communicating with a trap. At the back are two flushing inlets, the upper one connected with a perforated ring round the basin, the lower sending water horizontally towards the outlet. Slop-sinks are made of enamelled cast-iron basins, and with three upright sides inclining outwards, a wire screen to intercept useful articles, and a side flushing aperture. A trap for general house-waste is divided into two compartments and contains three distinct dips.

4451. Chimney tops and ventilators. M. Stevens.

A fan is arranged with blades to be driven by the warm air or smoke.

NOTICE.

THE SANITARY RECORD *is published every Friday morning, and may be ordered direct from the Publishers. Annual Subscription, 17s. 4d.; free by post, 19s. 6d.*

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Original Papers.

THE INSANITARY CONDITION OF MILKSHOPS, AS BEARING UPON THE DISSEMINATION OF DISEASE.

BY ERNEST TURNER, F.R.I.B.A.

(*Continued from page* 52.)

16. IN the months of January and February of the present year, there was a small epidemic of typhoid fever in St. Pancras', and out of thirty-five cases, thirty had used a particular milk-supply. The epidemic was conterminous with the walk of one milk vendor; but although Dr. Stevenson considered that there was no reasonable doubt that the milk was the vehicle by which the poison was disseminated, he could not obtain evidence to enable him to form a conclusion as to how the milk became infected. It should be noticed that 400 families were supplied with milk from the dairy referred to, and of these twenty-two, or 5½ per cent., were attacked with typhoid fever, a very much smaller proportion than in many other epidemics I have mentioned.

17. In February last, a group of eight cases of typhoid occurred in Clerkenwell. Here it was pretty clear that the seed was sown in the milkshop. A boy from Birmingham having typhoid fever was sent to his father in Clerkenwell, who kept a milk-shop, and the lad used the cup that was dipped into the milk for sale.

18. There have also recently been a few cases of typhoid at St. John's Wood, said to be caused by the milk-supply, but Mr. Lord, the medical officer of health, is of opinion that the outbreak was not to be attributed to this cause. A visit to the suspected farm showed that a pond which had been contaminated by sewage had recently been filled up. The cans were said to be washed at the shop some little distance from the farm, and hot water was even sent to wash the pails into which the cows were milked. To all appearances, if the milk had become infected at this farm it must have been through the addition of water, but this I am told there was no reason to suspect.

19. The most recent epidemic that has been attributed to a contaminated milk-supply was that at New Barnet, where there were 119 cases of scarlatina, 105 of which occurred between April 29 and May 4 of this year. Dr. Saunders considers the evidence he has obtained clearly establishes a relation between the epidemic and the milk-supply, but has no conclusive facts to adduce how the poison reached the milk. He says it must be regarded as an accident, and does not in his report suggest the primary cause, merely stating that he is in possession of certain facts which he considers desirable to withhold for the present. I shall not therefore comment on the conflicting statements current in the neighbourhood, as to a relative of the dairyman having fever; but will call attention to the fact that immediately contiguous to the dairy is a W.C. anything but sweet, supplied from a cistern that also supplies water for washing the cans, and that there is a sink in the dairy with its waste-pipe in direct communication with the drain from the W.C., and having no better means of preventing ingress of sewer gas than a movable bell-trap, a particularly objectionable device in this instance, as the dairy stands on the top of a hill, and is consequently more likely to be invaded by sewer-gas.*

The history here given of the various epidemics that have been traced to the milk-walk, and the inference that may fairly be drawn that many others have occurred from the same cause but have not been traced, will, I think, show what urgent necessity there is for the greatest care being exercised in order to prevent the possibility of milk being exposed to deleterious influences by which it may become contaminated. Cow's milk is too often the only food taken by infants, and the susceptibility to zymotic disease appears to be greatest in infancy and to diminish with age. Again, milk is frequently the chief nourishment taken by those in a delicate state of health, and their debilitated condition naturally renders them peculiarly obnoxious to the action of deleterious influences. The Adulteration Act has worked well, and has been of incalculable benefit, the milk being certainly much freer than it used to be from that numerous class of adulterations against which it is directed. Unfortunately, by the light now thrown by the advancement of sanitary science upon the subtle nature of such deadly poisons as those of typhoid and the like, and the insidious way in which they may be communicated, these intentional, and as we may term them, direct adulterations, appear in comparison of small importance. Dr. Grimshaw, of Dublin, for instance, is of opinion that besides enteric fever and scarlatina,† both cholera and small-pox may be communicated through the medium of milk, and with respect to an epidemic of cholera in Dublin states the grounds for his belief at some length. And this brings me to the second object I have in view in this paper, the respect, namely, in which recent legislation, excellent and useful enough so far as it goes, falls as yet short of the most urgent necessities of the case. Against what I have termed direct or deliberate trade-adulteration we have perhaps taken fairly efficient precaution. We have provided also to some

* I cannot refrain here from pausing a moment to deprecate in the strongest possible manner, the use, in any case, of this most unscientific and mischievous makeshift. It is dirty, dangerous, and deceptive, giving an appearance of a security that does not exist. There is no conceivable condition under which numerous better appliances might not easily be brought to bear, and the sooner it is entirely abolished the better. I would implore medical officers of health to exert all their influence to get rid of a contrivance which, instead of excluding foul air, simply serves as a cover for its introduction into the dwelling. And as bearing particularly on my subject, I will mention a case that came under my own personal observation in the dairy of a private house. In this dairy milk would not keep sweet, and the butter tasted rank, yet no cause could for a long time be discovered. Air-bricks were freely introduced but without effecting a cure. The drainage was to a cesspool, and in the centre of the floor of the dairy was a bell trap. This was removed, the drain properly ventilated, and there has been no complaint since.

† Dr. Orme Dudfield, in treating of the subject as regards scarlatina, says: 'It is probable that the contagion has found its way into the milk pail in the shape of cuticle from the peeling hands of the milkman, or that the secretions of the throat or the gums floating in the air of infected places have been deposited or absorbed,' and he has had under observation a series of cases of severe throat affection in families supplied from a dairy quite apart from the cowshed, and it was ascertained that members of the dairyman's family actively engaged in the business had suffered from disease apparently of the same nature. Dr. Dudfield, assisted by other medical officers of health, has suggested some very admirable by-laws with reference to cowsheds and dairies, and these have been submitted to the Local Government Board and the Metropolitan Board of Works.

extent against such indirect and unintentional poison impregnation as may result from carelessness, ignorance, or cupidity, on the farm or in the dairy. But there our precautions for the present end. Once let the milk be safely delivered to the retail dealer, and so long as he does not tamper with its market value by any of the recognised methods of direct and comparatively harmless adulteration, he may expose it with impunity to whatever indirect and far more deleterious influences he will. I have a nursery recollection of the sing-song daily cry of an itinerant milk-vendor, who, before the Adulteration Act, retailed 'milk' at twopence per quart, and well I remember the scene when he had been one day discovered watering the milk, and a bevy of Irish matrons, under the unorthodox but admirable inspiration of Mr. Justice Lynch, speedily applied more aqua-pumpaginis to him externally than he had probably used for such a purpose for a long time. This scene was brought vividly to my recollection the other day in a filthy milkshop at the East End of the town. 'Ah, sir!' said the proprietor, sighing deeply, as he observed my eye wandering in the direction of the water-but, 'Ah, sir! it's a rum sort of trade this is now—not what it used to be. People is getting so jolly artful there ain't no profit to be made.'

This was indeed a horrible place; I shuddered to think that any human being should take food that had been exposed there. A small shop in front, dirty in the extreme, the floor looking as if it had not been washed for a twelvemonth, and as if nothing but scraping off the filth would be of any use. Beyond, and opening out of it, a small foul-smelling back room where a woman sat suckling her child. Beyond these again the washhouse, without a square inch as a back yard, so that the ventilation to the middle room was like the light, 'borrowed.' In this washhouse stood the water-butt, and at the foot of it was a large heap of dust, decomposing vegetable matter, and broken eggs. 'Have you no other place for refuse?' 'No; that has to do for us.' 'It is not very sweet,' I remark. 'Well, sir,' answers the man in a little burst of confidence, 'you see at this time of the year eggs *is* strongish.' I do not, of course, mean to say that this was a fair specimen of the average London milkshop. But it was a fair specimen of a much too numerous class, a class too, be it observed, more particularly to be found in neighbourhoods specially subject to contagion, and specially adapted to spreading it. It may be said that the amount of milk sold at such shops is so small as to be hardly worth considering; indeed the inspectors tell me they do not sample the milk from shops where the sale appears very small, as the magistrates are loth to pay attention to such cases. But regard these places as foci of disease, and the matter assumes considerable importance.

In some London cowsheds I visited the other day, over 100 cows are kept, fifteen women are employed in milking, and the milk is sent to the families of some of the most exalted persons in the land. What are the probabilities in the course of a year of scarlatina alone in the families of fifteen poor women? What the probability that they will nurse their children, and continue at their work all the time? At this establishment, which has a good name, and is well spoken of at the Vestry Hall, the closet for the *employés* is in one of the large cowsheds, ventilation being by means of the door opening only into the shed; the water is not laid on.

It would occupy too much space to give in any sort of detail the results of my own personal investigations among the scores of London milkshops I have visited, but I may safely say that among them all I found comparatively but very few indeed, the sanitary arrangements of which were not dangerously inefficient. Here, in a dusty by-street, where the watering cart is an almost unknown phenomenon, you will find the milk standing in open vessels, its surface pleasantly coated with a rich cream of powdered horse dung, shoe leather, and other delicacies of the kind. Here again it will be kept night and day in a tiny shop some 10 feet square by 7 feet high; two well-grown, ill-washed, children sleeping in the room or rather cupboard which opens from it. The mother with two smaller but equally unwashed infants sleeping in the shop itself, where a low canvas screen across one end conceals by day the filthy bedding and blankets from one at least of the senses if not from the other. Here—once more—not in a low neighbourhood this time, but in aristocratic Belgravia, we find the milk set for cream in a vault under the pavement of the street from which the wet and impurities soak in through the leaky roof, the only ventilation being through a perforated zinc panel in the door immediately outside of which stands the fragrant dust-bin. Deficient accommodation is a constant source of mischief. The cleanliness of the milk-can is a very important consideration, and in the small shops where milk is sold, there is seldom other convenience for obtaining boiling water than the common tea-kettle; how often the cans are properly scalded, particularly in hot weather, when even greater care is required, can be well imagined. In 1873 Dr. Bartlett, who had for some years obtained his milk from the same dairy and had frequently tested it and always found the quality excellent, was surprised to find his servant complain during the hot weather of the remarkable rapidity with which it turned sour, and on one occasion the smell was so peculiar that he determined to investigate the matter.

Analysis proved that the milk was originally pure, but so energetic had been the development of lactic acid that on gently warming the milk the whole of the curd at once separated. It was found that powerful decomposition had commenced, and inspection of the can revealed that the lid was incrusted with a caseinous deposit, and beneath this were metallic lactates of copper, lead, and zinc. The fault lay with the milkman, who, to avoid the trouble of taking home the small cans, used to rinse them at a neighbouring pump, and they were thus used over and over again without being scalded.*

Ignorance, again, is, as may readily be imagined, another fertile source of mischief. The pride with which one is so frequently told, 'My waste-pipe is carried into the trap under the closet,' is quite amusing, the said trap, of course, being precisely the most dangerous place to carry a waste-pipe into. In one case, where the people who kept the place evidently took a pride in its general cleanliness, the water-but was uncovered, exposed to the full heat of

* Probably few people, in passing the better milk shops, have noticed the array of cans all standing with their lids open, or if they have noticed it have been aware of the reason for their being placed so; even after cans have been washed at night with hot water and soda, if they are left till the morning with their lids closed, milk put into them will turn sour in a very short time. This opens the question of the desirability of using some antiseptic at the time of washing the cans.

the sun ; the sides and bottom being consequently green with vegetation.

Nor, if evil springs from the limited accommodation at the common milkshops in the poorer districts, are their bigger rivals at the West End and elsewhere by any means *sans reproche.* The very exigencies of their more luxurious trade afford in themselves a fresh source of danger. When I commenced my survey of milkshops, I expected to find the smaller ones only calling for ameliorated sanitary conditions, but I can now state that many of the largest and most pretentious-looking are by no means free from defects likely to be injurious to health. There are some establishments where hardly any milk is kept, and none set for cream, where the milk arrives in churns twice a day, and is sent out immediately, with hardly the possibility of becoming injuriously affected. But there are others, very numerous, where milk is kept and set for cream. This is probably done in vaults under the foot-pavement of the street, clean, cool, the walls lined with white tiles, slate troughs filled with spring water, and large, clean pans full of milk standing in them. Surely, says the casual observer there can be no danger here? Perhaps not. But here the milk must stand for at least twelve hours for the cream to rise, and what is the drainage? The house-drains run under the floor of the vaults, there is no trap between the vaults and the sewer, the soil-pipe is not ventilated, nor is there any independent ventilating pipe. There are three traps, one bell-trap, and two D-traps in the floor of the dairy, and these slight water-seals are apparently the only obstacles to the entrance of sewer-gas. How little reliance is to be placed upon such contrivances has been pointed out so many times in this journal that further comment is unnecessary. I must say, in justice to the proprietor of the establishment to which I am now more especially referring, that he expressed his willingness to adopt any suggestion for the improvement of the dairy, and within a few days I saw the plumber putting up a ventilating pipe from the drain. Watering, again, on the other hand, and be it observed that watering is *lawful* so long as it be practised, or made to appear as if practised, openly, is of course a self-evident means of impregnation with disease-poison. Entering one of those small chandler-shops that abound in every poorer neighbourhood, and where everything seems to be sold, from chalk to cheese and castor oil to currant jelly, I ask the proprietor, 'You sell milk, I believe?' 'Yes,'—then, seeing the inspector following me, 'but not genuine milk.' This was of course to avoid prosecution. On questioning, he admitted that he added water to the milk to the extent of one gallon in eight. The water was drawn from an imperfectly covered cistern, *directly connected with a water-closet in a filthy condition.* We all know, too, how often, perhaps in charity, perhaps correctly, or perhaps in fear of the law of libel, epidemics that have occurred where a contaminated water-supply has been proved, have been attributed to the use of water in *washing the cans.* It is, however, unfortunately, a fact proved by analysis, that much of the milk supplied is watered at the farm, and again by the retail vendor. And this not in London only. In the season at watering-places the demand for milk so far exceeds the ordinary supply that the dairyman—and I am speaking, not from hearsay, but from my own personal observation—is often tempted to set up a little private watering-place of his own.

And, finally, there are the numerous cases where contamination may arise from causes beyond the milkshop-keeper's control.

(*To be continued.*)

VITAL STATISTICS OF SHEFFIELD, 1876.

THE study of vital statistics, and of their use for the purpose of determining the relative sanitary condition of different populations, is beginning to bear fruit. The statistical treatment of local sanitary reports is beginning to show marked progress, although want of uniformity in tables and in the grouping of facts still materially adds to the labour of studying such reports, and of deducing from them useful results. It was but natural that medical officers of health, when first called upon to prepare statistical tables, and to deal with mortality statistics in detail, should have experienced difficulties, and that some of these difficulties should have been misunderstood. Many of the annual reports on the sanitary condition of our large English towns in 1876, bear conclusive evidence that the medical officers of health have become earnest students of vital statistics, and it is impossible to over-estimate the advantages which the science of public hygiene will derive from the labours of those health officers who are able and willing to combine statistical research with an intimate knowledge of the practical details of sanitation. Among the reports to which we have alluded in which the handling of the statistical portion of the work affords evidence of study as well as care and accuracy, Dr. Griffiths' report upon the health of Sheffield in 1876 calls for especial notice. It may be useful to pass briefly in review the contents of this valuable report, not only because the subjects dealt with are full of interest, but because the way in which the figures are tabled and handled might with advantage serve as a model for their treatment in other reports, in many of which it is frequently still confused and confusing.

The report commences with a statement of the estimated population of the borough in the middle of the year, which serves as the basis of all the subsequent calculations, and an explanation of how the estimate was obtained. Dr. Griffiths, while not doubting the approximate accuracy of the estimated population (274,914 in the middle of 1876) expresses his belief that he should be supplied with an annual return of the number of inhabited houses on the rate-book. There can be no question that such a return should be made to each sanitary authority every year, and its seems hard to believe that the town council would refuse to accede to such a suggestion from their officer of health. The number of persons living in the middle of the year at each of five groups of ages, based upon the proportions enumerated in 1871, is also given. The small variations in the proportions of persons living at different groups of ages, from year to year, makes this method of estimate reliable, and enables the death-rates at each of several groups of ages to be calculated, which is essentially important.

The marriage-rate in Sheffield in 1876 was 19·5 per 1,000 persons living, against 21·2 in 1875. The birth-rate which was 41·6 and 41·2 in 1874 and 1875 was 41·1 in 1876; this remarkably stationary birth-rate may be taken as evidence that the estimated population of the borough is not far from the true

number. The number of illegitimate births registered in the borough in 1876 was 538, equal to 4·8 per cent. of the total births, showing a slight increase upon the proportion in 1875 when it was 4·4 per cent. The proportion of illegitimacy ranged in the different registration sub-districts from 3·2 in Nether Hallam to 7·7 in West Sheffield.

We have often maintained that the control of vaccination, and the responsibility for its due and efficient performance should be vested in the various sanitary authorities under the advice of their medical officer of health, and Dr. Griffiths' figures bearing upon the amount of vaccination in Sheffield appear to show the need for some alteration in that borough. The figures scarcely support Dr. Griffiths' opinion that vaccination 'appears to be well carried out in Sheffield.' The mean number of births registered in the borough in 1875 and 1876 was 11,157, and yet only 9,066 vaccinations were recorded in 1876, of which more than 200 were probably of persons aged upwards of one year. More than 2,100, or nearly 20 per cent. of the children born in Sheffield, appear to have escaped vaccination. Can this be true? Information relating to vaccination should invariably find a place in health reports, as means are thereby afforded for estimating the amount of danger to be apprehended from the importation of this most dreaded of the zymotic diseases.

The death-rate in Sheffield in 1876 was equal to 24·2 per 1,000, and showed a further decline from 26·9 and 24·8, the ratio which prevailed in the two preceding years; the rate was no less than 2·2 per 1,000 below the average rate in the borough during the six years 1870-75. In 1876 the deaths in Sheffield were 592 fewer than they would have been if the rate had corresponded with the average rate in the six preceding years. Dr. Griffiths remarks that the 'marked decline in the Sheffield death-rate in 1874 and 1875, not only from all causes, but from the principle zymotic diseases, affords strong presumptive evidence of a corresponding improvement in the sanitary condition of the borough, which is further corroborated by the steady decline of infant mortality in recent years.' After distributing the deaths recorded in public institutions, it is shown that the death-rate in the nine registration sub-districts of the borough, ranged from 20·7 and 21·5 to 28·4 and 31·6 respectively. Registration sub-districts very seldom form convenient statistical areas for comparing the varying rate of mortality in different portions of large towns. Investigations, undertaken with reference to a representation under the Artisans' Dwellings Act of 1875, prove that the corrected death-rate in certain portions of an area reported to be unhealthy, and situated in the North registration, was, during 1876, equal to 43 per 1,000. Dr. Griffiths, moreover, expresses his conviction that in certain portions of Park sub-district a still higher death-rate would be found to have prevailed.

As a standard for measuring the recorded death-rate in Sheffield, Dr. Griffiths publishes the normal death-rate for the borough, calculated with due regard for the age distribution of the population of the borough. Judged by this life-table standard, the actual death-rate in Sheffield in 1876 showed an excess of 12 per cent.; the excess of the male death-rate was equal to 19 per cent., whereas that of the female rate was but 8 per cent. It is not unimportant to have it thus conclusively shown that 'the causes which produce excessive urban death-rates affect the male more severely than the female portion of the population.' It would be interesting to know whether the same results would be given by a similar comparison of the death-rates in other large towns, and how far the female death-rate in towns is affected by the large but varying proportion of domestic servants.

The mortality in Sheffield at each of the five groups of ages, among males and females, is considered separately, and compared with the respective normal life-table standard rates. Infant mortality, which has in recent years shown a considerable decline in Sheffield, is dealt with in much detail; it is only possible here to touch briefly upon one point—that is, the excessive rate of mortality among illegitimate infants. The proportion of deaths under one year of age, to births registered, averaged 169 per 1,000 in the borough, but ranged in the different sub-districts from 154 in Attercliffe to 189 and 190 in South Sheffield and North Sheffield. The rates of infant mortality showed a general decline from those which prevailed in 1875. Dr. Griffiths, however, shows that whereas the rate was only equal to 162 per 1,000 among infants born in wedlock, it was so high as 305 per 1,000 among those born of unmarried women. In Attercliffe sub-district the rate of mortality among illegitimate infants was equal to no less than 591 per 1,000 born out of wedlock; such a proportional mortality, which was almost as great during 1875, Dr. Griffiths says, 'suggests the probability that in some form or other "baby farming" is carried on in this part of the borough.'

The rates of mortality from the different classes of diseases, at each of the five groups of ages, is shown in Table E, and discussed at length. The causes of death are also shown in detail at each group of ages for 1876, compared with similar figures for the three preceding years. The means are also provided for studying the mortality from the various diseases in each of the several registration sub-districts; this renders it possible to analyse the causes which conduce to the excessive death-rate in some parts of the borough.

The death-rate from puerperal diseases in Sheffield was equal to 3·7 per 1,000 children born alive, whereas in London the proportion was 4·8 per 1,000. The death-rate of puerperal women in Sheffield has been continually below the English average in recent years, which speaks well for the strength of constitution of the women, as well as for the skill of the medical profession and of the midwives.

In all reports of medical officers of health that deal with the statistics of causes of death, it is very desirable that something should be said of the way in which causes of death are certified in the locality, as the proportion of uncertified deaths varies very considerably, and in some places to a considerable extent vitiates these statistics. Dr. Griffiths tells us that in 526, or 7·9 per cent., of the deaths registered in Sheffield during 1876, the causes were not certified either by registered medical practitioners, or by coroners; in other words, no scientific evidence of the cause of death was produced in 526 cases at the time of registration, 'affording dangerous facilities for the concealment of cases in which gross, if not criminal, negligence may have contributed to the death recorded.' The proportion of uncertified deaths in Sheffield, which had been 8·2 and 6·2 per cent. in 1874 and 1875, rose again to 7·9 in 1876. In the South and Park sub-districts of the borough the proportion of uncertified deaths in 1876 was equal to 14 per cent. Especial reference is made to the fact that

the proportion of inquests held in Sheffield in 1876 was only 2·6 per cent., whereas in nineteen other of the largest English towns it ranged upwards from 3·8 in Oldham to 8·0 in Manchester. The Registrar-General has often pointed out the intimate relation which exists between the proportions of inquests and of uncertified deaths, and Dr. Griffiths asserts positively that the death-register 'affords undoubted evidence that too few inquests are held within the borough.' It appears that in Sheffield in many instances the cause of death is returned as 'unknown' by the relatives of the deceased, who have neglected to provide medical assistance, and many cases of violence are registered without any certificate either from medical practitioner or coroner. It is not unusual to blame the local registrars and the Registrar-General for this laxity of system, but those officials are helpless in the matter. If no registered medical practitioner have been in attendance on a deceased person, the law makes no provision for any certificate of its cause, unless an inquest be held; although registrars are instructed to refer to coroners all cases of death by violence, as well as all cases attended by suspicious circumstances, there is no power to secure such cases being investigated, if the coroner or his officer decide that an inquest is unnecessary. Thus in Sheffield last year the cause of the death of an infant, aged three weeks, registered by its mother, who signed by mark, was described as 'Found dead in bed, supposed to have been overlaid'; again, the child of a forgeman, aged thirteen months, was stated, on the information of its father, to have been 'accidentally run over by a cart.' These causes of death were unattested by any form of certificate, and were derived from the mere statements of persons who may have contributed to the deaths by negligence or otherwise. This laxity in the matter of holding inquests does not augur well for the safety of human life in Sheffield. The defects of the present inquest system are supposed to be now under consideration, and as exemplified in Sheffield call for speedy legislation.

The task we set ourselves, to analyse the vital statistics of Dr. Griffiths' report, has occupied too much space to allow present notice of other features of the report in question. In conclusion, however, we would especially recommend to the notice of other sanitary authorities of rapidly increasing urban districts, besides that of Sheffield, Dr. Griffiths' remarks upon the dangers of the premature occupancy of newly-built houses, and the urgent necessity for by-laws which should prevent the habitation of any new houses until they have been certified as fit for habitation by the medical officer of health as well as the surveyor of the district.

A LETTER from Dr. Saunders, the medical officer of health, was read at the meeting of the Barnet Rural Sanitary Board on the 26th ult., with reference to an outbreak of diphtheria among six children, three of whom died, at Kenwood's Farm, Finchley, in the occupation of a labourer named Wilson. Dr. Saunders, having examined the premises, states that there was nothing in the sanitary condition of the dwelling to account for the disease; but the water-supply, which was pumped from a well on Lord Mansfield's park, was polluted. This well also supplied Lord Mansfield's dairy and house adjoining it, and he had obtained some evidence from the occupiers that they had suffered from diarrhœa at different times, and notably at the time the children of Wilson were suffering. The Board ordered a copy of the letter to be sent to Lord Mansfield.

THE

SANITARY RECORD.

FRIDAY, AUGUST 3, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

CERTIFIED CAUSES OF DEATH AND MEDICAL OFFICERS OF HEALTH.

UNTIL the Public Health Act of 1872 became law, and the appointment of medical officers of health, instead of being exceptional, became general, medical certificates of the cause of death were seldom turned to scientific account except as forming the basis of the series of weekly, quarterly, and annual reports issued by the Registrar-General. It appears, however, that the value of this gratuitous, and till recently voluntary, service on the part of the medical profession, has been insufficiently recognised by the State. The legislature, by a clause in the Births and Deaths Registration Act of 1874, made it compulsory on medical practitioners to furnish certificates of the causes of the deaths of all patients attended by them during their last illness. Nothing short of the most urgent necessity ought to justify the State in making a gratuitous service compulsory; but it cannot well be denied that in the interests of public health and sanitary science scientific information as to the cause of all deaths is urgently necessary to be recorded. The State, however, which pleaded justification in making this gratuitous service compulsory, refuses to acknowledge the necessity for scientific evidence of the cause of death in cases where the deceased persons have not been attended by a medical practitioner during their last illness. This inconsistency gives the profession just cause for complaint. The value of the information contained in medical certificates is materially depreciated by the fact that in about 10 per cent. of the deaths entered in the register, the cause is either derived from a coroner's certificate or supplied by an unqualified practitioner, a midwife, or by the ordinary informant of the death, generally a relative of the deceased. It is needless here to refer to the vague meaningless verdicts which are returned in so large a proportion of inquest cases; and in the interests of public morality as well as health it is manifestly undesirable that it should be possible to register and bury deceased persons, especially infants, without the production of some scientific evidence of the cause of death. This is a subject important alike to the public and the profession, and it may be hoped

that no exertions will be spared to secure its being satisfactorily dealt with when the appointment, duties, etc., of coroners is legislated upon (probably in the approaching Session).

The Births and Deaths Registration Act of 1874, in addition to making it compulsory upon medical practitioners to furnish certificates of the causes of deaths of their patients, enacted that the names of the certifying medical practitioners should be inserted in the death-register. In this particular the English registration practice was assimilated to that which had prevailed for some years in Scotland. The new system, which came into operation on January 1, 1875, has been found to work well, and is on the whole preferable to the previous anonymous system. There can be no doubt that the certification of causes of death, although still far from perfect, has much improved in recent years. It is to be regretted, however, that the manner of certifying causes of death, and the uses to which the certificates are put, are not sometimes taught in the medical schools. The classification of the causes of death would thus be facilitated and the value of mortality statistics very considerably enhanced. The use of precise terms, and above all clear writing are essential. With regard to the writing, it should be borne in mind that registrars, who have to copy the contents of certificates into the register, are not acquainted with medical terms, and are thus unable to make a judicious guess at a cause of death illegibly written. A case recently came under our notice in which the cause of death was entered in the register as 'Equinia,' suggestive of glanders; the medical practitioner had, however, intended to write 'Eczema,' but we are bound to acknowledge that the registrar was not to blame, while he showed his ingenuity in guessing at 'Equinia,' the word in the certificate being simply illegible.

Since the passing of the Public Health Act, not only have medical officers of health been generally appointed, but copies of the death-register are now almost invariably supplied to them, as essential to the due performance of their sanitary duties, and to enable them to prepare, for presentation to their sanitary authorities, periodical mortality statistics for their respective districts. Copies, therefore, of all the medical certificates of the causes of death, with the names of the certifying medical practitioners, thus pass into the hands of medical officers of health, who unfortunately in too many instances, are medical practitioners themselves. This affords but one of the many reasons which make it so essentially desirable that medical officers of health should not be engaged in private practice, in fact that public and private hygiene should become two distinct branches of the profession. The late Dr. Rumsey urged the necessity for the revision and verification of all causes of death, whether certified or uncertified by medical practitioners, and suggested that this duty should be delegated to the superintending sanitary officers. This suggestion was made before the general appointment of medical officers of health, upon whom devolve a considerable proportion of the duties which Dr. Rumsey assigned to his proposed superintending sanitary officers, and the question now arises, how far it is desirable that medical officers of health should be entrusted with the revision of causes of death. With regard to all deaths we have invariably maintained that some scientific evidence should in all cases be produced previously to registration and burial, and when the machinery by which this scientific evidence is to be obtained in cases where no registered medical practitioner was in attendance during the last illness of the deceased is ripe for decision, the local medical officer of health will probably be fixed upon as the most fitting person upon whom to fix this new responsibility. The revision, however, by medical officers of health of medical certificates of the cause of death, furnished by registered medical practitioners, is by no means so clearly desirable. Granting that a certain percentage of medical certificates are carelessly, and some incorrectly filled up, what means have medical officers of health, without holding a formal medico-judicial inquiry, calling evidence, and probably holding a *post-mortem* examination, for deciding upon the accuracy of an apparently incorrect certificate? The Registrar-General and Dr. William Farr, for the purpose of their periodical reports, have not felt justified in disregarding the formal certificates of a registered practitioner, and have contented themselves with classifying the causes of death as certified. At the same time, these officials do not scruple to point out the difficulties under which they suffer from imperfect certificates. While, therefore, it is infinitely desirable that this important, though gratuitous, duty of filling up medical certificates should be performed in such a manner as to yield trustworthy results, the profession has a right to resent any tampering with their certificates, according to the unfettered idiosyncracies of medical officers of health. Several instances have recently occurred in which medical officers of health have, in the preparation of reports to their sanitary authorities, taken upon themselves to ignore causes of death certified by registered practitioners. This is not only objectionable from a professional point of view, but it will tend to destroy the public faith in these local reports if the causes of death returned are not those entered in the death register and certified by medical practitioners who were in attendance on the deceased, but those of which the medical officer of health believes they must or ought to have died.

It will be sufficient to point to one case which has recently come under our notice, in which the causes of death in a local report have been manipulated in the manner described, instead of being returned as they are registered. In his last quarterly report upon the health of the Hove Improvement

District, really part of Brighton, the medical officer of health reports that of 56 deaths registered during the three months ending September 30 last, the only deaths from zymotic disease were nine from diarrhœa. In his remarks it is stated that one of the nine deaths from diarrhœa was returned as a case of English cholera, this death was of a female, aged sixty-one years, certified as 'cholera morbus.' It is well known that during the summer some cases of diarrhœa are returned as cholera, but it appears to us preferable that deaths should be reported as they are certified and registered, and not as the medical officer of health imagines it ought to have been certified. With regard to the cause of another death, the medical officer of health for Hove adopted a similar course. The death of an infant, aged sixteen days, was certified as 'typhoid fever, ten days, diarrhœa four days;' as no death from fever is reported it may be pronounced that this certified death from typhoid fever, as well as the one from cholera before-mentioned, was referred by the medical officer of health to diarrhœa. A case of typhoid fever in an infant, aged sixteen days, is undoubtedly unusual, but it becomes a grave question whether, without reference to the certifying medical practitioner, or any special opportunity for forming a reliable judgment, a medical officer of health is justified in returning two deaths certified from cholera and typhoid fever as fatal cases of diarrhœa. Such a course would in all probability lead to more serious errors of classification than the acceptance of the causes of death as certified in the death register, and would naturally tend to destroy all faith in local reports of medical officers of health, who would thus lay themselves open to the charge of manipulating an unduly favourable bill of health for their sanitary district.

Full discussion as to the manner in which causes of death are certified cannot but be useful, and medical officers of health, who now share with the Registrar-General the difficulty of satisfactorily classifying a certain proportion of causes of death which are loosely filled up, may afford valuable assistance to the discussion. We cannot, however, too emphatically protest against an increasing tendency on the part of medical officers of health to accept the responsibility of 'revising' causes of death, as certified by registered medical practitioners.

Notes of the Week.

THE Queen has given a subscription of 50*l.* towards the expenses of the Social Science Congress to be held in Aberdeen in September next.

THE Government of the Canton of Zurich has just authorised the cremation of human bodies. It will be optional, subjected to certain restrictions.

THE Barnsley sewerage works, constructed near Ardsley at a cost of 50,000*l.* are now at work. The system adopted is Mr. Bailey Denton's intermittent filtration and broad irrigation.

THE town council of Chatham have been appointed the port sanitary authority for Chatham and Rochester.

THE St. Neots local board, at a meeting specially convened to discuss the gas, waterworks, and sewerage questions, resolved unanimously, that it was desirable that they should become the proprietors, on equitable terms, of the existing gasworks, and appointed a committee to negotiate with the gas company.

MR. CHARLES HOLMAN PARKS, surgeon, has been elected medical officer of health for the rural sanitary district of St. Colomb Major, at a salary of 65*l.* per annum. Mr. Moorman has held the appointment for the past two years with a salary of 100*l.* per annum. There were several other applicants whose tenders varied from about 60*l.* to 400*l.*

IN a recent report to the Leigh rural sanitary authority, the nuisance inspector mentioned the case of a clergyman, the Rev. W. Thorpe, curate of Golborne, Lancashire, who lets ten or a dozen white rats have the run of his house. He had inspected the premises, and finding the rats to be a nuisance, had given the usual notice to abate it, which the board approved.

THE Local Authority in Glasgow has now opened three 'lavatories,' under proper management, for the special accommodation of females of every class in three different districts. Should these places be taken advantage of to any considerable extent, others will be opened at different points in the city. London and other large cities will do well to take a lesson from Glasgow on this matter.

MAJOR FRANK BOLTON, the Metropolitan Water Examiner, states in his monthly report that the deterioration of the waters of the Thames and Lea generally by sewage pollution continues, and points to the necessity of measures being adopted to prevent the contamination of these rivers and their tributaries by the people living on the upper reaches, who now treat the tributary streams as well as the rivers as common sewers, both at their sources and during their course. The population of the country through which the Thames and Lea flow is rapidly increasing in density, thereby tending to establish centres of pollution for the Metropolitan water-supply.

THE carriage-way of Fleet Street has been repaved with wood from Ludgate Circus up to Bouverie Street, being a superficial area of 3,400 square yards of paving. About 120,000 blocks of wood and 85 tons of asphalte have been used in this pavement. The foundation of the latter consists of concrete nine inches deep over which is spread asphalte to the depth of half an inch. On this the blocks of wood are laid, and asphalte is filled in between the interstices to about one-third the depth of block, the filling in being completed with tar and gravel. The question of paving the rest of Fleet Street is still under consideration; and it is probable another kind of wood pavement will be laid down so as to test the merits of two systems.

INSECURE CORNICES, ETC.

It has frequently happened in London, as elsewhere, that owing to improper bedding, to perished cramping, or some other of the faults of construction, or of wear and tear, fatal accidents have occurred, following upon the fall of a cornice, of a coping, of a pediment ornament, or of a heavy balustrade. It does not appear that it is anybody's precise business to ascertain whether the overhanging stonework of this description is in a safe condition, and unlikely to descend upon the passers by, as was the case with an ornament not long ago in a crowded city thoroughfare. We are led to make these remarks from learning the particulars of the fall of a balustrade surrounding the square of Somerset House, a few days ago, which might have led to a serious loss of life.

THE BISHOP OF MANCHESTER ON INTEMPERANCE.

SPEAKING at the opening of a coffee-tavern at Manchester, the Bishop of Manchester said the efforts of temperance friends had been called tinkering with a great evil. He was afraid that until it became a fixed idea in the minds of the people that the health of body and mind, the comfort of people in their homes, the morality of our young men and young women was infinitely of more importance to the country, and an infinitely greater source of wealth to the country, than the twenty or forty millions which were derived from customs and excise—until the happy day came when Chancellors of the Exchequer would no longer point to a rising revenue from excise as a proof of the prosperity of the country, he was afraid that all their dealings with this demoralising element in the life of our countrymen would be nothing more than tinkering. There are three coffee-taverns now open in Manchester.

SEWER VENTILATION UNNECESSARY.

AT the Sanitary Engineers Conference held at Bristol the other day, the borough engineer, Mr. Ashmead, to the evident astonishment of some of the members present, contended that it was not absolutely necessary to ventilate the sewers of a town or city, and also said that if he had to lay sewers down anew, he would still adhere to that principle. Bristol, he said, stood almost alone in this matter, its sewers having been worked successfully for upwards of twenty years without ventilation. He was of opinion that if the original construction of sewers was effectual, and the supply of water ample, ventilation was rendered unnecessary. Mr. Ashmead afterwards read a paper on the drainage of the City and County of Bristol, in the course of which he stated that the borough extended over an area of 4,687 acres, or nearly eight square miles, with an estimated population at the present time of 202,950, and about 140 miles of streets and roads. For drainage purposes the borough had been divided into six districts; the total length of the sewers was forty-three miles, and their cost 169,232*l*. The average death-rate before the construction of these works was 28 per 1,000, and for the year ending January, 1875, it was 22·7.

We shall be curious to see the proceedings of the Association, and to notice in detail all that was urged for and against the present system, which is mainly one affording all possible ventilation of the cloacal pipes.

ARTIFICIAL BUTTER.

THE manufacture of artificial butter is becoming an important industry in the State of New York. From 30,000 lbs. to 100,000 lbs. of fat is brought daily from the large abattoirs of the city and its vicinity to factories to be made into oil, a considerable part of which is manufactured into 'oleo-margarine' or artificial butter. There are two kinds of oleo-margarine. In one the oil is adulterated with just enough cream to allow of its being churned, the proportion of cream to oil being about 1 to 20. This kind is made in large factories under a patent. Butter-dealers claim to be able to distinguish it from dairy butter without difficulty, as it lacks the texture of the genuine article. Its manufacture is limited, and much of it is exported, so that little of it is to be found in the American market. The other kind of oleo-margarine is that in which the oil has been largely adulterated with cream, to the extent of perhaps 50 or 60 per cent. It is made in considerable quantities by country dairymen, and none but the most experienced butter-dealers can detect its composition. Opinions differ as to the value of oleo-margarine as an article of diet. An act lately passed by the Legislature of New York 'for the protection of dairymen and to prevent deception in the sale of butter,' provides that all packages containing artificial butter shall be plainly labelled with the name 'oleo-margarine,' and that all retail dealers when selling it shall furnish the purchaser with a card also marked 'oleo-margarine.'

DAMAGING GAS MAINS.

A MOST important case was recently brought before the Wandsworth magistrate, in which some workmen, had, it appeared, broken the 38th section of the Gas Works Clauses Act of 1871, in a most extraordinary manner. The directors of the Gas Company said that they felt it to be their duty to the public to take notice of the offence. On the 30th ult. there was a serious escape of gas, and on the roads being opened the pipes were found broken. In one case a drain pipe was covered over it, and in another a piece of pocket handkerchief was placed over the hole, the result being a serious escape of gas and an explosion. The prosecutors asked the magistrate to impose such a penalty as would act as a caution to persons, in laying down drain pipes, not to interfere with gas mains. The chief witness said the defendant's men had been at work opposite his house, cutting into the main sewer for the Board of Works, and that there was a very serious smell of gas both inside and outside the house. He saw the road opened, and a large hole cut in the pipe. The company repaired the damage. The defendant said he had no knowledge of the damage until he had received an application to pay the cost. His man admitted putting his pick in the pipe, but omitted to give information to the foreman.

The magistrate, after remarking that the builder was responsible for the acts of his workman, fined him 40*s*., and it appears that some 20*l*. more is recoverable in another court. Here is a case where the ignorant labourer is again at fault, and it is to be hoped that with the next generation such a piece of gross want of knowledge will not be possible.

FALL OF OLD BUILDINGS.

IT does not often happen that accidents result from the demolition of old buildings, because the greatest care is taken by the surveyor of the district, and for the matter of that also by the dealer in old building-material who may have purchased it standing. A sad case occurred, however, the other day, in Bethnal Green Road, in which two men lost their lives. From the evidence given it seems that the houses in question were three storeys high, with basement and attics, and that the outer walls were nine inches thick. The foreman admitted that the binding of the walls was defective, but the defects would not, he averred, be apparent while the walls remained in fact. He intended to have taken the walls down on the day after the accident, and he should have examined them before doing so. He had taken down houses in the City 200 years old, and had taken the same precautions for the public safety as in this case. The pantiles, roof, flooring-boards, and window sashes, had been removed by other contractors, but nothing of a substantial nature, such as joists or girders, had been in any way interfered with.

It appears that the buildings were duly hoarded round to a height of nine feet, with a fan or sloping top, as is usual, and it was not until the crash came that the weakness of the structures became evident. It would, therefore, it is evident to us, be a wise plan to give every such building a wide berth in passing it, and, if possible, even cross the street in so doing. At present, under these sloping-topped hoardings with their wooden railings, there is usually a crush or a jostle, and the pedestrian is longer there than at any other part of his journey, thus doubling his chances of meeting with a mishap of one kind or another.

ON SERUM OF BLOOD AS A THERAPEUTIC.

MR. VACHER, the medical officer of health for Birkenhead, has been engaged in making some experimental researches on disinfectants, and has extended his investigations to the best method of preserving the serum of blood from undergoing putrefaction so as to admit of its use as a medicine. He refers in his pamphlet to the extent to which blood is used in France both as a food and medicine, and to the great success which has attended its use in

many cases of debility. As the idea of taking blood before it has coagulated is repulsive to most persons, he advises the use of the serum, as it possesses very many of the advantages of blood itself, containing about 48 per cent. of albuminous matter, and being rich in various salts which are necessary for building up the body. His great difficulty was its preservation in such a state as to be fit for use, and he therefore tried the action of many chemicals which are ordinarily used to prevent putrefaction, and amongst these were creosote, chloralum, sulphurous acid, chlorate of potash, Condy's fluid, camphor, and spirits of chloroform. He found that the chlorides, and chlorate of potash, spirit of chloroform, and camphor preserved it best. The remedy was found most useful in the treatment of thread and round worms, as well as a substitute for cod-liver oil, in doses of two tablespoonfuls for a child, and a large wine-glassful for an adult. The experiments are valuable as supporting the belief that Condy's fluid and some other disinfectants are not suitable for arresting decomposition, whilst the chlorides, such as Burnett's fluid and the Universal Disinfecting Powder, are those best suited for use in drains, cesspools, and offensive accumulations.

SANITATION OF ROYAL DWELLINGS.

WHEN subsequently to the severe illness of his Royal Highness the Prince of Wales the sanitary arrangements of Sandringham House were thoroughly overhauled, it was found among other things that a great deal of the water-supply to the house was of a most unsatisfactory and dangerous kind; and sometime later the Royal Commission on the Pollution of Rivers published in their sixth report, under so late a date as June 1874, a series of analyses of the domestic water-supply of Sandringham House (made by them apparently in 1871), showing that from the great majority of the taps about the house and offices the water drawn was of the most highly polluted and dangerous character. Indeed, although the analyses speak for themselves, the commissioners almost exhaust the English language in the adjectives of condemnation which they apply to the water, nearly all of it being so loaded with organic contaminations as to be quite unfit for consumption. Subsequent to the drawing-up of this report it was decided to remodel the water-supply, and to obtain from a source of undoubted purity some distance from the house an adequate supply of pure water. When, therefore, it became known recently to those who were investigating the sources from which the poison of typhoid fever could have been taken into the system of the Prince Albert Victor, that during the young Prince's stay at Sandringham the new water-supply had become temporarily disarranged, and that recourse was had for a few days to the old supply, suspicion was at once fastened upon this source of infection, and it was considered probable that the attack was due to the drinking of polluted water at Sandringham. Subsequent investigation seems to indicate that inquiry should not end here, and that other causes must be looked for. In the first place, we understand, that when the commissioners' report was made known, and attention was called to the dangerous character of the water, it was at the same time pointed out that one of the springs supplying the house yielded a very pure and excellent supply. An order was issued, and was from that time observed that no table water should be drunk except that which was supplied from the tap connected with this spring. It is also stated that when on the recent occasion referred to it was found necessary to revert for a few days to the old supply, no what was supplied for drinking purposes except that from this erource. Moreover, the date of the young prince's illness does not, upon a more careful comparison, corresponds even after making allowance for the period of incubation, to the days when the inculpated water-supply was being used at Sandringham. On the whole, therefore, it is considered that, even allowing for the chapter of accidents, which requires, under such circumstances, a large margin, this could hardly have been the means by which the typhoid poison was absorbed, nor has any satisfactory explanation yet been found. It is indeed well-known that Marlborough House, when it was first handed over for the occupation of the Prince of Wales was under exceedingly bad sanitary conditions. It was situated over drains of a complicated, old-fashioned, and very bad construction, such as it was impossible to maintain in a healthy state. By reconstructing the main-drain as well as it could be managed, and by ingenious arrangements for ventilation, carried out under the best scientific advice, most of these disadvantages were overcome. The site is, however, a bad one. The surrounding drainage system is complicated and defective, and from time to time, smells the reverse of savoury are wafted into the grounds from the ventilating holes. Further inquiry is on foot as to the water-supply and other hygienic conditions of Marlborough House, for it is evident that nothing can be more unsatisfactory in such a case than that the precise cause and source of the typhoid poison should be left unascertained. It has been commonly said, that if a sanitary inquiry were held in every case of typhoid fever we should at last succeed in completely stamping out this fatal and thoroughly preventable disease. It is specially desirable that in so striking an instance as this, in which the third in succession of the Royal House has fallen a victim to typhoid poison, no means should be left unused of determining the source of the poison and excluding its further operations.

Special Reports.

DOMESTIC ECONOMY CONGRESS.

(*Continued from page* 59.)

HOUSE CONSTRUCTION, VENTILATION, ETC.

MR. R. RAWLINSON, C.B., read a paper upon 'Buildings for Working Men.' Stress was laid upon good sites, ample air space, and proper provision for ventilation.

This was followed by a paper by Dr. A. Hill, medical officer of health for Birmingham, on 'The Construction of House Drains.' Dr. Hill urged that the waste-water drain and the night-soil drain should be separate; and by means of diagrams, showed a method of construction for preventing the entrance into houses of sewer gas.

THE APPOINTMENTS AND APPEARANCE OF THE WORKING MAN'S HOME.

Mr. Frank Curzon (organising secretary of the Yorkshire Union of Mechanics' Institutions) submitted a paper on 'The Appointments and Appearance of the Working Man's Home.' The writer stated that if a school was to do its work efficiently, that work must be assisted and carried forward in the home. Modern schools were now more commodious and cheerful. The homes from which their children came to school were generally in the most dreary and dirty contrast. In nearly every considerable town in England the workman's home might be sketched in painfully truthful lines. In a back street or a dark crowded alley or yard, sometimes in a damp cellar, often in a garret without ceiling; and when better off, occupying a couple of rooms on a second or third floor, a family group of six were lodged. There was no chance of dividing the rooms into distinct uses. Where they ate their meals half the family must sleep. Let them turn to the practical and easy remedy for all this. First of all, let the education of their youth of both sexes embrace the fullest knowledge of the laws of life and the duties of home. The paper also pointed to the advantages of training the young to prudence, dwelling on the importance of penny banks and building societies, by which a man might build a house for himself. With regard to a workman's home, he estimated that it could be built for 200*l*. Its situation should be some half-dozen miles from work, in a clean, bright district, and where the railway would give the workman a

cheap pass. The house should have five rooms, and the paper described the way in which these should be constructed. The writer alluded to the desirability of suitable decoration, and deprecated the 'cheap buildings' which were being put up as detrimental to health. He would have the decorations of the rooms of quiet and chaste patterns, and as dainty as the money could purchase. Supplementing his paper with remarks, Mr. Curzon said, as to the situation of workmen's dwellings, he did not like the Peabody arrangement. He should like to see workmen have separate and independent homes.

Mr. George Skey (Tamworth), in opening the discussion on the papers, said he was sure that the importance of the subject of buildings for working men could not be overrated. While agreeing with the numerous suggestions which had been made on the matter, he asked what they were to do with reference to the cost. He had done a little in the practical way by building twenty-four houses for workmen, and he built half-a-dozen houses for the labouring classes, which people were pleased to call model dwellings. The property, on which he had spent a considerable amount of money, was still in his possession; but what about the return for it? It was not three per cent. He reminded them that the cost of building was enormous, and he wanted to know how they were to meet the difficulty. He found that the experiment did not pay. If these buildings had paid an ordinary interest he might have gone on with the scheme. He was sorry to say that even in Birmingham speculative builders were putting up a number of houses which the sanitary authority would prevent if they had the power. If they could bring forward some economical and complete plan for building such houses as had been suggested, then he thought the thing might be done, but not otherwise.

The Rev. Brooke Lambert said, with regard to the question of cost, raised by Mr. Skey, the plan had been tried in London with success, and the houses had given a return of 5 per cent. Those houses were paying mainly from the fact that the tenant had an interest in conserving the property, and so the waste and expenditure were enormously reduced. He thought any scheme would be useless without some such provision as that.

ERRORS IN DIET.

Mr. H. W. Hart (Professor of Dietetic Pathology) spoke in reference to errors in diet. He said they could not have a greater illustration of the errors of diet than in the widespread dyspepsia throughout the country, and he would suggest that medical men who took an interest in their fellow-creatures should combine together with a view to inform the public as to what was proper diet. He was prepared to prove, after years of study and experience, that the dietetic reform advocated would greatly benefit the nation, and especially our soldiers and sailors, whose profession demands physical ability of no common order. Proper food should be capable of sustaining and invigorating every organ of the human body, and maintaining uniform health for any length of time, without the assistance of stimulants, tonics, or aperient medicines. Meat was generally supposed to be the most nourishing of food, but it was not so. It was more stimulating than nourishing. There was a certain amount of nourishment in it, and it could be partaken of with advantage as well as relish, but it did not supply all that was really necessary for the sustentation and growth of the various parts of the human body. Milk, ripe fruit, vegetables, and farinaceous foods would sustain life more or less perfectly; but to obtain this desideratum to perfection recourse must be had to wheat, as used by our ancestors a hundred years ago, before the invention of 'sifting' and 'dressing,' by which the grain was deprived of all its most important properties. The value of bread made of the entire grain, and without fermentation, would, if freely and constantly used, and excluding starchy foods, effect a speedy and marked improvement in the physical and mental condition of all who partook of it. The great disadvantage of Scotch oatmeal was that it was unduly heating to the human system, by reason of the excessive proportion of phosphate of lime which it contained, which really rendered it most unsuitable as a food for adults, and when eaten by children made them feverish and irritable, and if constantly used caused skin and other diseases hitherto unaccounted for.

LINCOLN DRAINAGE.

SIR JOHN HAWKSHAW has presented a report to a committee who are interested in the prevention of the floods of the River Witham. The works he proposes will necessitate the cutting of a new channel outside Lincoln, as well as other works, the cost of which will be 567,820*l.*, exclusive of Parliamentary or engineering expenses. In concluding his report, he says:—'The benefits afforded by the proposed improvements to some of the above could not be measured by acreage alone. The parts of the city and suburbs of Lincoln which are now subject to floods would be greatly increased in value, and the low lying lands about the city would become much more valuable as building land. I have before alluded to the benefit which the city would derive from filling up the Sincil Dyke and the Gowts. The Great Northern Railway would be relieved from much anxiety with reference to the embankments for which they are responsible. The general improvement in the river, both above and below the Grand Sluice, as well as the rebuilding of the sluice, would benefit the navigation, and the railway would be relieved from danger of flooding, to which it is liable. The town and haven of Boston would be benefited by the improvements in the river through and below the town, by the enlargement of the Grand Sluice, and by the increased scour, due to the better flow of water which there would be through the haven when the floods are at their height. Before concluding my report I will venture to make a few general remarks. My experience in drainage works has taught me that there are defects in their management in this country which it would be well to remedy. For several years I have been connected with works in Holland, including, incidentally, drainage works on a large scale. The supervision of those works in that country, on the safety of which so much depends, is, as might be expected, much better than in England. Many of our defects arise from the great variety of jurisdictions. The internal drainage works are often under one control, and the main drainage works under another, and some works appear to be under no definite control whatever. An instance of the latter kind seems to exist adjoining the Trent at Torksey, where last winter an embankment was nearly breached, and still remains in a very dangerous state. The waters of the Trent last January rose four feet higher than those in the Foss Dyke, and a breach in that embankment would have flooded Lincoln and the lands drained by the Witham to a still more serious extent than they were flooded. In cases in the district now under review, and in others, the safety of valuable property has been a question of a few inches, and has often depended upon a few shovelfulls of clay hastily thrown up, or what is called "cradging," and which may or may not be effected in time. This might be remedied if every drain, main or subsidiary, on which the safety of the lands in the district depended, were put under one control, and the body vested with that control were armed with powers to levy funds, not only for the construction of the works, but also for their repairs and maintenance.'

THE COFFEE PUBLIC-HOUSE ASSOCIATION.

THE following statement has been forwarded to us for publication by the honorary secretary of this association:—'A fresh instance of the modern tendency towards mutual counsel and concerted action for the furtherance of social movements has just appeared in the Coffee Public-House Association. Within the last few years a number of joint-stock companies, as well as private committees,

have been formed in London and elsewhere with the object of providing the public with alternative places of refreshment and recreation for the beershop and gin-palace, and under their direction several successful houses have been opened. The association is not intended as a rival to these companies or committees; it is rather formed to stand to them as the Workmen's Club and Institute Union stands to the societies affiliated to it. It had its origin in a conference which was numerously attended by persons interested in coffee public-houses, held in June at Grosvenor House. The committee then appointed have met more than once under the presidency of the Duke of Westminster, and now publish a prospectus prepared by an executive committee, of which the Right Hon. W. Cowper-Temple, M.P., is chairman. The association justifies its existence by referring to the natural reasons which make public-houses a public necessity, the undesirable tendencies of existing public-houses, the demand for united action to compete with the great vested interests which support them, and the scale on which the work as a national effort must be carried on. While pointing out that coffee public-houses can be made not merely self-supporting, but remunerative, and insisting that unless financially successful they cannot be of extended application or permanent use, the association recognises the hesitation with which capital is invested in new undertakings, and appeals to persons who may be interested in the work for other than pecuniary reasons. The committee feel that a Central Association can demand an influence denied to local efforts, and can reach funds which are not available for investment in joint-stock companies. The money subscribed to the association will be applied, firstly, in the collection and diffusion of knowledge on the establishment, and working of coffee public-houses, and the conditions essential to their success; and secondly, in advances of capital by way of loan to local committees, companies, or private individuals who can offer suitable security and satisfy the committee of the successful prospects of their undertakings. In exceptional cases the committee will have a discretion to make grants of small amount, while the interest received on loans will be applied for the general purposes of the association. We doubt whether, having regard to the lateness of the season, the committee will be in a position to commence operations before October; but in the meantime we may state that any information as to the objects of the association may be obtained on application to the hon. secretaries, 35 Park Street, Grosvenor Square.'

Medical Officers' Reports.

GREENOCK.—The reports for the three months ending June 2, show that the annual death-rate was 25·0, which was higher than usual in consequence of the great fatality of inflammatory diseases of the lungs, and of infectious diseases in May. There were three cases of enteric fever in one house adjoining the 'West Burn, which is in that part of its course foul and stagnant.' Dr. Wallace proposes that it should be cleaned and arched over. Indeed, enteric fever seems to be very prevalent in the town, as twenty cases occurred in the three months, out of a total of eighty of infectious diseases reported to the sanitary staff.

WHITECHAPEL.—Mr. Liddle's Report for 1876, contains, amongst other information, the number of deaths from each of the seven principal zymotic diseases in London for each year from 1838 to 1876 inclusive, and the death-rates in London and Whitechapel for the same years, which show an immense decrease in the mortality of Whitechapel, especially in 1876, when it was only 23·9 against 22·3 for all London. The population of Whitechapel decreased about 2,400 between 1861-71 and has probably decreased since, which may, to a certain extent, disturb the calculations. Mr. Liddle adduces as proof of the beneficial effects of sanitary action, the diminished death-rates in London, and the small increase in the death-rates of Islington and Hackney, although the density of their population is much greater than in 1856. But, as he takes for 1876 the uncorrected rates for these districts from the Registrar-General's returns, which includes deaths of non-residents in the fever and small-pox hospitals, his figures for these two districts are much too high. The sanitary works carried out indicate considerable sanitary activity in Whitechapel, as might have been expected from so energetic a sanitarian as the medical officer of health.

JARROW.—The population is estimated at 20,000; the birth-rate was 43·2, and the death-rate 18·2 per 1,000 population, which is much below the average. The death-rate from the seven chief zymotic diseases was 2·9 per 1,000, by far the greatest mortality having been caused by diarrhœa, especially in infants. There were 212 deaths, or 58·4 per cent. of the whole amongst children under five years old, so that it is clear that many of the deaths were preventable. The deaths from tubercular diseases were 16·5 per cent. of the whole, against 13·8 for all England. Mr. Spear complains of the badly paved and drained yards in the poorer houses; of the imperfectly ventilated rooms, as many houses are built back to back; and of the evolution of sulphuretted hydrogen by the waste from the various factories which drain into the Don. He complains of the manner in which the scavenging is carried out, and of the want of a hospital for infectious diseases. This report is also useful as it deals fully with the drainage, foundations, and walls of houses from a sanitary point of view. Sanitary work was actively carried out.

MERTHYR TYDFIL.—The population is estimated at 53,000; the births were 1,764, the vaccinations 1,640, and the deaths 1,019, so that the birth-rate was 33·3, and the death-rate 19·2 per 1,000 population, against a mean death-rate of 25·7. Mr. Dyke believes the population to have been reduced by the young and able-bodied leaving Merthyr from want of employment. The number of deaths from zymotic diseases was smaller than usual, as no epidemic prevailed during the year, and the deaths from consumption were less than formerly, in consequence of the good drainage of the place. Mr. Dyke also points in forcible terms to the diseases and deaths resulting from the high wages and consequent altered dress and food during the three years of great prosperity, as the men wore fine cloth instead of homespun, and the women silk instead of flannel, and therefore contracted inflammatory diseases of the lungs, etc. He also states that the purification of the sewage still continues to be chemically a great success. The average duration of life in 1876 was 30 years, against 17½ years in 1852. The rainfall in 1876 amounted to 63 inches, against a yearly average of 56 inches.

Law Reports.

A DOUBLE MILK-PROSECUTION.

C. REYNOLDS, of 33 East Street, Manchester Square, was summoned for selling milk diluted by water. The certificate of Dr. Whitmore, the food analyst of the parish, showed that the milk was adulterated by seven per cent. of water. Dr. Whitmore said that he believed the adulteration arose by lumps of ice being put into the milk to cool it. The defendant denied that any ice had been used by him as described. The milk was sold as it was received from the farmer. The defendant was fined 1*s.* and costs. C. A. Land, dairy farmer, of Uxenden Farm, Middlesex, was summoned for selling adulterated milk to the defendant in the last case. This summons was dismissed, the prosecution having fallen through on a technical point, the provisions of the Act not having been strictly complied with in reference to the defendant being supplied with a sample of the milk.

BRICKFIELD CHILDREN.

AT the Slough Petty Sessions, W. Treddaway, a brick moulder, was fined 20*s.* for employing his daughter at his 'stool,' the girl being under the age of 16. Mr. James Henderson, sub-inspector for the district, said it was the first case of the kind he had had in that brick-making neighbourhood for three years. The Uxbridge and Brentford districts have also been free from such convictions this season.

ARTISANS DWELLINGS COMPANY.

DR. BAXTER LANGLEY, the well-known member of the Sunday League, and Mr. Gladstone's colleague at the last Greenwich election, and Messrs. Swindlehurst and Saffery, have again appeared at Bow Street, on the charge of having conspired to defraud the shareholders of the Artisans' Dwellings Company. The magistrate accepted the two brothers of Swindlehurst in 1,500*l.* each for his appearance, and the bail of Dr. Langley was increased from one surety in 500*l.* to two in 750*l.* each.

ACTION BY MILK RETAILER AGAINST WHOLESALE DEALER.

AT the County Court, Brighton, a woman has sought to recover from a dairyman the amount which she had been fined for selling milk adulterated with 'extract of butter fat.' Plaintiff alleged that she sold the milk in the condition that defendant supplied it to her, and therefore maintained that the defendant was the person on whom the penalty should fall The deputy-judge informed the plaintiff that she was entitled to a verdict if she could prove that the milk was adulterated before she purchased it. As she was unable to produce corroborative evidence on this point, his honour adjourned the case in order that it might be tried by a jury.

OFFENSIVE ASHPITS.

THIRTEEN persons occupying houses belonging to the Sheffield Building Society, were recently charged with allowing the privies and ashpits of which they are the occupiers to be in such a state as to be a nuisance and injurious to health. Mr. Birch proved that he visited the premises and found the ashpits in a very filthy condition. He posted a notice on the premises, but the defendants failed to comply with it. The medical officer of health deposed that he found the refuse standing in the yard, and it was necessary for health that it be removed.—The summonses in two cases were withdrawn, and an offer was made to do the same in the other cases if a promise was given that the nuisance be remedied, and the costs, 4*s.* 6*d.*, paid. This was agreed to by all but two defendants, on whom the Bench thereupon imposed a penalty of 10*s.*, in addition to the costs.

ADULTERATED GIN.

W. BURRELL, of the Two Brewers, 164 High Holborn was summoned for selling adulterated gin. Dr. Redwood reported that the liquid was composed of 42 degrees of water to 58 of proof spirit. Dr. Redwood, in cross-examination, stated that all gin was necessarily diluted, and came from the rectifiers about 20 or 25 below proof. It was sold, on the average, at about 30 or 22 degrees below proof at the price charged by defendant, so that his gin was 10 per cent. lower than the trade generally supplied at 2*s.* 1*d.* per bottle.—Mr. Child contended that the Act did not refer to the sale of spirits, unless there was proof of something of a deleterious nature being mixed therewith. The trade sold three or four qualities of gin, and the buyer was the best judge of what would suit his palate.—Mr. Vaughan observed that the buyer could dilute his gin at home, and the more he diluted it the better; but the public had no right to be asked 2*s.* 1*d.* for an article 10 per cent. weaker than the average quality sold at that price. The summons was adjourned.

ADULTERATION OF BREAD.

E. WALKER, baker, of Vauxhall Street, was summoned by the Lambeth vestry for selling bread adulterated with alum, so as to be injurious to health. Defendant desired to plead guilty, but urged that the adulteration was not like that of water being added to milk to increase the bulk. The alum would make no difference in the bulk of the loaf. The magistrate pointed out that the question before the court was that of adulteration of an article so as to render it injurious to health. The alum was considered injurious. The defendant said he did not mind taking alum. Fined 40*s.*, and 12*s.* 6*d.* costs.

NOISE FROM FOWLS.

A GENTLEMAN in West Brompton, who was accompanied by a lady, waited upon the magistrate to complain of the noise from his neighbour's fowls, commencing at daybreak, and continuing until about eight o'clock. He handed in a medical certificate for the lady, who was in ill-health and suffered from the noise. He had called upon his neighbour, but without effect. He asked the magistrate to grant a summons. Mr. Bridge said it was difficult to say what formed a nuisance. The applicant thought everything which interfered with the peace and comfort of neighbours was a nuisance. Mr. Bridge said they must be neighbours in the ordinary state of health. He directed a constable to wait upon the neighbour. The applicant said if it was not effectual could he apply again? Mr. Bridge hoped it would be effectual.

DEFECTIVE VENTILATION IN A GOVERNMENT FACTORY.

A DEVONPORT jury has returned a verdict of 'Accidental poisoning,' in the case of an ironfounder in the Government Factory at Keyham, Devonport. Deceased, without orders, went into a house where moulds are dried, and was there found dead. The medical evidence proved that death resulted from poisoning by noxious gases, and some of the jury, who had evidently been in Admiralty employ, elicited from a witness that the ventilation of the whole factory was lamentably defective, and that strong complaint had been made, but with no result. The jury requested the coroner to impress upon the Admiralty the need of at once improving the ventilation of the factory, which was dangerous to the health of the operatives, and injurious to the public service.

A MILK SQUABBLE.

J. DAVIS, Park Dairy, Park Road, Peckham, was summoned by Comfort, a sanitary inspector for refusing to sell a pint of milk, and also for assaulting him. Some weeks ago the defendant was summoned for selling milk adulterated. When it was supplied to the inspector the defendant told him it was 'milk and water,' and therefore the summons was dismissed. Subsequently the inspector got a little girl to come out of a house in a street where the defendant was supplying milk and purchase a pint. She did so, and handed it, in a jug, to the inspector. The defendant, seeing what had happened, took hold of Comfort, and the milk was spilt. Comfort then demanded a pint of milk, which the defendant refused to sell. Summonses were then taken out. Mr. Ellison held the objection of defendant's solicitor to be tenable—that as the milk was not exposed for sale the summons could not be sustained. The assault was a very slight matter; but the object was to prevent the inspector getting milk to be analysed, and the penalty would be 40*s.*, with costs. Costs were also allowed on the summons dismissed. Mr. Washington complained that a child ten years of age had been employed and paid to get the milk. Mr. Ellison said he agreed with this, and hoped that the Vestry would not in future permit such young children to be engaged and to be brought into court for examination.

WASTE PAPER IN STREETS.

MR. C. H. FIELD, linen-draper, etc., of Churton Street, Pimlico, was summoned under 57 George III., cap. 29, sec. 4 (commonly called the Paving Act), for throwing waste-paper on the foot and roadways. Mr. W. Rogers, who prosecuted for the Westminster Board of Works, explained that the system of throwing waste-paper on the footway and gutters stopped the flow of water down the channels, and on getting into the gulleys stopped the traps. The defendant had previously been cautioned. Mr. Field said his servants had orders to save all the paper, for it was valuable, and if any piece by accident dropped on the pavement it was invariably picked up. Mr. D'Eyncourt said there was a question of degree as to the quantity of paper thrown down, and ordered the defendant to pay the costs and not repeat the offence. This was all the Board wished.

A WELL-STOCKED FARMYARD.

W. FREEMAN, of West Hill Road, Southfields, Wandsworth, was summoned with respect to a nuisance on his premises. It was stated that the inspector found an accumulation of manure, twelve goats, fourteen pigs, three or four dozen fowls, and a similar number of rabbits, within a short distance of houses. An underwriter at Lloyd's, residing nearly opposite the defendant's premises, said there was a frightful stench. He could not open his windows when the wind was from the east, all the inmates in his house having been ill. He had never complained to the defendant, as he thought the proper course was through the Local Board. It also appeared that the accumulation of manure had been removed, that the place was kept clean, and in its present state was not a nuisance. The defendant said he did not wish to cause a nuisance, and commented on the fact that Mr. Hanley did not communicate with him. He intended to sell the goats. The summons was adjourned for the attendance of a medical witness.

NUISANCE FROM SMOKE.

NEIL, McHaffie, and Goslett, ironfounders, of Latimer Road, Notting Hill, were summoned for using a furnace so constructed as not to consume the smoke. Mr. Sandison, the inspector, described the appearance of the furnaces at the time of his visit, and said they were not constructed to consume the smoke. They were smoking badly up to Friday night. He saw smoke from the premises while in a railway carriage, and on the platform of the station. The premises were close to Latimer Road station. Stoking would not cause the smoke, as the furnaces were properly constructed. He had known 7 cwt. of coals used in stoking, and not any smoke to be seen.—Mr. Marshall, for the defendants, said that since the complaints everything had been done to carry on the business so as not to cause annoyance. The furnaces had been constructed on such a principle as to prevent any smoke.—Mr. Bridge said that did not get rid of what was done before. The third section did not empower him to remit the penalty. He fined the defendants 40*s.* and 1*l.* 13*s.* 6*d.* costs.

THE WORKSHOPS' REGULATION ACT.

MADAME DELBARRE, milliner, of 73 Elizabeth Street, Eaton Square, appeared to answer ten summonses for unlawfully employing women after four o'clock P.M. on Saturday, July 7. Mr. Stevenson, inspector of factories, showed that at five o'clock in the afternoon he visited the premises, and in one back room he found three young women at work, and in another twelve or fourteen preparing to go, having evidently just finished. The defendant said sometimes the young ladies left earlier than the appointed time. It was, in fact, a give-and-take arrangement. One of the girls, however, admitted that they were all at work after four o'clock. Mr. Woolrych thought it sharp work to take ten summonses, when one or two would answer the purpose. Had the offence occurred before? The inspector said, Yes; some three years ago. The defendant interposed, and said it was then shown that the young lady was doing her own work, and the case was dismissed. Mr. Woolrych convicted in three cases in a penalty of 1*l.* each, and 6*s.* costs, no costs in the other cases.

NEGLECT TO FILTER TOWN WATER.

V. C. HALL has had before him the case of *The Mayor of Leamington* v. *Oldham*, an action by the Leamington urban authority to restrain the defendants from permitting water to be pumped into the reservoirs for supplying the town which should not have passed through the filtering-beds provided for the purpose, or have been otherwise effectually filtered and cleansed. It appeared that the defendants, in 1856, entered into a contract to construct works and to supply the town mains with water to the extent of 500,000 gallons a day, which contract bound them to effectually cleanse the water by proper filter-beds; and the plaintiffs complained that of late, chiefly owing to its being permitted to pass through a certain culvert, the water had been by no means free from impurities; and the counsel for the plaintiffs stated that one witness had found at dinner a live leach an inch long in his water-bottle, and that another witness could testify to the presence in water supplied to him of a decomposed eel. Mr. Graham Hastings, Q.C., for the defendants, said that they had not used the culvert in question, and did not intend to do so; that they were quite ready to enter into an undertaking that the water should be properly passed through the filter-beds, for it was the practice so to filter it, any impurities in the water being accounted for by the neglect of the town to provide proper storage. It was arranged that the defendants should give an undertaking which was substantially in the terms of the notice of motion, and that the motion should stand over to the hearing.

OVERFLOW OF SEWERS.

ON the Midland Circuit, at Leicester, Mr. Justice Mellor and a special jury have tried the case of Barber *v.* the Corporation of Leicester, an action for damage done to the cellars of the plaintiff by negligently causing the sewers to be so built as to be a nuisance and prejudicial to health, and for neglecting to repair and cleanse the sewer. The plaintiff carried on the business of a publican at the Foresters' Arms, Frog Island, Leicester, a low-lying part of the town between the river and the canal. The water in the canal above the lock is some inches above the level of the street, and the plaintiff's cellars are below the water level. During the heavy rains in July, 1875, the river overflowed, and a large amount of surface water was poured into the sewers and drains in Frog Island. The same thing occurred several times in 1876 and 1877. The plaintiff's cellars were frequently filled with water, sometimes with sewage matter. For the plaintiff it was contended that the inconvenience was the result of the inefficient system of drainage adopted by the Corporation; that the pumping apparatus was insufficient in rainy weather, and that the Corporation had negligently allowed the sewers to become choked. For the defendants it was asserted that there had been no negligence, but that the mischief had been principally the result of immoderate rains, 'amounting to the act of God.' As to the mixture of sewage, it was shown that occasionally the sewers were choked by wool waste improperly getting into the sewers, where it formed a plug and stopped the water. In such case, it was alleged, the obstruction was found and removed, and the damage to the plaintiff was unavoidable on the part of the defendants, and resulted partly from the defective nature of the plaintiff's drains and cellar. The judge directed the jury that there was no evidence of faulty construction of the sewers and that the Corporation was not answerable for the result of the floods; but the question for them was, whether the damage to the cellar had been caused by the negligence of the defendants

in not properly cleansing and repairing their sewers, according to the Public Health Act, under which they were bound to take proper means and use reasonable care. This case, which it is expected may be followed by others, caused a considerable interest. The jury returned a verdict for the plaintiff—150*l.*

COMPENSATION FOR DAMAGES.

THE Master of the Rolls has had before him the case of the *Mayor of Birmingham* v. *Allen*, a question of some importance being raised with respect to the duties of the official referees. The action was brought by the Corporation, as owners of the gas-works at Swan Village, against a firm of colliery proprietors. On May 5, 1876, the plaintiffs moved for an injunction to restrain the defendants from working the coal near the gas-works, so as to cause subsidence of the surface and consequent injury to the buildings thereon; but the motion was directed to stand over on an undertaking by the defendants not to work their coal within a certain distance of the gas-works in the meantime. At the trial of the action the Master of the Rolls dismissed it with costs, and referred it to the official referee to inquire what damages, if any, the defendants had sustained by reason of the temporary stoppage of their workings. This decision was affirmed on appeal, and the official referee reported that damage had been sustained by the defendants to the amount of 2,042*l.*, without stating the facts of the case or his reason for so finding. The Master of the Rolls said that the position of the official referees had been misunderstood. They might be asked to report to the Court upon any question upon which the Court required instruction, and whenever the question was one upon which the Court, as in the present case, required a great deal of information, it was emphatically the duty of the referees to report the facts in cases referred to them. In the present case the official referee had merely reported a lump sum as due for damages, and thereupon these motions were made. It was obviously impossible for the Court to discuss the question in dispute without knowing either the mode in which the official referee calculated the amount, or the facts on which the calculation was based; and his Lordship was entitled to be informed of those facts, because the official referees were appointed to assist the Court on questions of fact, and not to decide any case finally, but merely to report on it and leave the decision to the Judge. His Lordship had accordingly directed a communication to be made to the official referee, who supplied a most complete report, containing every fact, and giving his reasons. His Lordship then gave his reasons for reducing the amount to 1,549*l.*

BRIEF NOTES OF CASES.

GAS COMPANY POWERS.

1877. *Thompson* v. *Sunderland Gas Co.* — 'Gas Works Clauses Act, 1847, § 6.' Laying of pipes under a highway. Damage to arches belonging to plaintiff.—Held that an arch was a 'building,' and that compensation was payable. (*Times*, June 26, 1877.)

STREET.

1877. *Salisbury* (*Marquis of*) *ex parte.*—Rule *nisi* against the Metropolitan Board of Works to make a road which the Board was under a statutory obligation to make. (*Times*, July 23, 1877.)

WATER COMPANY POWERS.

1877. *Metropolitan B. W.* v. *New River Co.*—Claim of Board to be supplied at a specially low rate with water for watering streets.—Judgment for the company. (*Times*, June 16, 1877.)

WATER RIGHTS.

1877. *Taylor* v. *St. Helen's Corporation.*—Grant of a 'watercourse.'—Held not to carry a right to enlarge the watercourse; the grant was a certain watercourse, not of all the water which could be made to reach the watercourse if it were altered. (*Times*, June 23, 1877.)

Review.

Report of the Proceedings of the Metropolitan Asylum District Board, for the twelve months ending December 31, 1876.

THIS is a very important document which has been drawn up by the chairman of the managers, Dr. Brewer, on the financial condition and general management of the asylums as well as of the number of cases admitted, and percentages of deaths from small-pox, scarlet fever, enteric and typhus fevers; also some data as to the number of imbeciles and of boys in the training ships under their charge.

It appears that the managers have power to raise on loan the sum of 800,000*l.* which has been exercised to the extent of 700,000*l.*, and the remainder will be borrowed from the Metropolitan Board of Works. Of this sum 64,000*l.* have been repaid, and every loan is repayable in sixty years by annual instalments with one small exception. The number of imbeciles under their charge on January 1, 1877, at Leavesden, Caterham, and Clapton was 4,510, but as these places were overcrowded a new building is being erected at Darenth, Kent. There were 303 boys also in the training ship, *Exmouth.*

The brief history of the small-pox epidemic up to March 31, shows the extreme rapidity with which this disease spreads when once it has assumed an epidemic form, and therefore the great importance of isolating the earliest cases. There has, however, been a marked difference in this epidemic as regards the large proportion of cases of the hæmorrhagic type, which always afford an excess of deaths as compared with ordinary cases. As this type has not yet disappeared, it is probable that the disease will last for some considerable time longer.

In the early part of the year the hospitals were entirely empty; but in the month of May there were twenty-four, in June above forty patients, and by July 20 eighty-two; but after that date, and up to September 9, there were less. From this time the numbers rapidly increased until about October 11, when there were 186; there was then a slight decline for a week, when the diagram shows an exceedingly sharp ascending curve reaching to December 6, when there were 590 cases under treatment. There was then a sharp decline for a fortnight to 520, and a more rapid ascent to the end of the year, when there were 766 cases under their care.—As these figures have been taken from the diagram there may be a day wrong in the dates, as each ruled space represents a week.—In order to meet the demand for accommodation, huts were built upon the grounds of the small-pox hospitals at Homerton and Stockwell; the imbeciles were removed from Hampstead, and small-pox cases taken there; a large factory in Dod Street, Limehouse, was engaged, and the new hospitals at Fulham and Deptford pushed forwards. The total permanent accommodation in these hospitals is 1,194 beds. The managers consider that if they had had as much room in 1871, the mortality from that epidemic would have been less. They also state that, although at one time there was some difficulty in providing for all the applicants, yet now they believe that there is room for all, even after allowing for the large number of non-pauper applicants.

Dr. Brewer next gives some important statistics as to the efficacy of vaccination. It appears that 341 persons have been employed in their hospitals, that two only—one an unvaccinated person (a scrubber), and the other, who was not revaccinated, contracted the disease in a severe form; whilst three more suffered from 'a very modified form,' although the intensity of the small-pox poison in this epidemic is unusually great. Indeed, in unprotected persons it is said to have the 'strongest analogy to the

black-death of the latter part of the fourteenth century.' It is also pointed out that although the nurses have not contracted the disease, yet they have from time to time suffered from languor and ill-health, which necessitated careful supervision of their health. The total number of cases admitted during the five quarters from January 2, 1876, to March 24, 1877, is 4,634; of these 821 died, 3,030 were discharged cured, 783 remained under treatment. The mortality amongst the vaccinated and unvaccinated is shown by the following table.

Mortality from Small-pox 1876.

	Vaccinated.	Unvaccinated.
Stockwell Small-pox Hospital	12·2	50·0
Homerton ,, ,,	10·5	44·6
Hampstead ,, ,,	10·8	41·3
Homerton Fever Hospital	8·9	43·6
Means	10·8	45·8

This table shows that the highest rate of mortality occurred at Stockwell, both of the vaccinated and unvaccinated; that the deaths amongst the vaccinated ranged between 8·9 and 12·2 per cent.; whilst amongst the unvaccinated it oscillated between 41·3 at Hampstead and 50·0 per cent. at Stockwell. Surely no stronger argument can be wanted to show the comparative protection afforded by vaccination, even when insufficiently performed. As regards the immunity resulting from proper revaccination, we must again notice the almost entire freedom from small-pox among the nurses of the hospitals. The death-rate is calculated by adding together the admissions, discharges and deaths, dividing by three, and then using this number as the dividend, the divisor being the number of deaths multiplied by 100. This will give in a series of years a correct death-rate, but, as those remaining under treatment are not taken into account, can scarcely be absolutely correct for one year. Dr. Farr, however, approves of the plan. As regards the death-rate from other diseases, it appears that from scarlet fever it was 11·6, from enteric fever 19·7, from typhus 20·5, and from other diseases 25·1 per cent. The daily cost per patient, including all charges, varied between 1*s.* $0\frac{16}{32}$*d.* and 2*s.* $2\frac{4}{32}$*d.*; the latter being at the Clapton Asylum. The number of patients received from each of the different metropolitan districts is not given, but we suppose will be stated in the reports of the medical officers of the hospitals as in former years.

There is one important point just touched upon in the report which has been frequently referred to in our pages, viz., whether or not provision for the treatment, not only of cases just above the pauper class, should be made as hitherto by this board, but also if they should provide means of isolation for all residents in the metropolis afflicted with infectious disease who may desire to be admitted into a hospital. This is a very large matter, but we hope in the interests of the public that no case will be turned away if there be room, no matter to what station in life the affected person may belong.

Correspondence.

All communications must bear the signature of the writer not necessarily for publication.

VITAL STATISTICS.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Mr. Humphrey, as an interested party, is not competent to settle the questions at issue between us. He cannot be both defendant and judge and jury all at the same time. He evidently wants all the playthings *and* the doll. I therefore appeal to you, and again suggest that the statements and arguments on both sides should be submitted to some competent but entirely disinterested umpire.

In your *L'Envoi* your last words are, 'We shall be tolerant of the freest criticism.' This promise I now plead, and ask you to be no respecter of persons. Those of us who have ventured to criticise the Registrar-General's statistical methods have hitherto been crushed by his official weight and influences. But after all we are not altogether a ragged crew. Dr. Rumsey, Dr. Letheby, Mr. John Hawksley, Dr. Sergeant, Dr. Tripe, Mr. Andrew Watts, of Nunhead, and last, but not least, the Registrar-General for Scotland, are a few of the names I could select as uncompromising antagonists of the Registrar-General. Surely we deserve to be confuted with something stronger than sneers and mere assertions.

Mr. John Hawksley says that to his knowledge the Registrar-General's returns are not correct statistics at all. They are mere figures. If he (the Registrar-General) would return these figures alone, and not pretend to deduce results from them, but allow proper persons to draw conclusions, then they would be of value. Now year by year the Registrar-General takes the duty of thinking for all the people in the kingdom, and 'drawing conclusions which are entirely his own, and are not worth the paper they are written upon' (SANITARY RECORD, No. 18, page 308). Mr. John Hawksley's opinions are at least of equal weight as Mr. Humphrey's, as indeed are any of those of the above quoted authorities.

This question is one of vital importance, and on one side or the other should be finally settled. If our side is right, then a great number of towns will at once be relieved from a great deal of odium they now labour under. If the Registrar-General is correct, these same towns must be still further blackened. Any way, the Registrar-General must do what he neglects to do now—that is, make allowance for the influence of the birth-rate on the death-rate.

One very remarkable fact must be noticed, and that is, that a high birth-rate is universally accompanied by a high death-rate. The Registrar-General's healthy places are invariably those which enjoy low birth-rates. It must also be noticed that in accounting for these things the Registrar-General has, since the controversy commenced, shifted his ground. At one time he argued that a high birth-rate proved that the population contained a large proportion of healthy-period lives. Next he stated that a high birth-rate produced a large proportion of healthy-period lives.

It is not well for anyone holding an official position, and who hopes for advancement, to fight any of the powers that be. Especially is this the case with country officials. We cannot avail ourselves of either official or press influence or assistance, and get looked upon as black or troublesome sheep. Moreover, we hardly know whom we are contending against. Is Mr. Humphrey our real opponent, or whom? But I appeal again to your promise in your opening number, and ask you, in the hope of persuading you, to lay the case before a competent umpire. I ask you to lay, not only my own contentions, but also those of Mr. John Hawksley, Dr. Letheby, and the leaders in the controversy, before this judge. For my own part, I will loyally abide the decision, but I shall not keep my peace while I am met with the mere opinions, wishes, and predilections of Mr. Humphrey.

EDMUND J. SYSON,
Medical Officer of Health.

Sanitary Invention.

CROSSLEY'S SELF-ACTING VALVE VENTILATOR.

THE importance of securing proper ventilation in our dwellings is daily becoming better appreciated by the public. The medical profession—and especially that portion of it engaged as medical officers of health—are continually urging its importance on the public mind as a

first requisite in any satisfactory sanitary condition of a house. Inventive skill is also constantly being directed to meet the growing demand for suitable appliances to meet the exigencies of varying conditions.

In new buildings architects are now providing special flues for ventilating purposes; but, unfortunately, in the great bulk of houses already built no special provision whatever has been made.

With our modern low fire-places, with contracted openings to the smoke-flues, and our large consumption of gas, for light, the rooms of the mansions of the wealthy are positively worse off as regards ventilation than the ordinary cottage of the working man.

Dr. Arnott was one of the first to appreciate the evil of this defect in ventilation in ordinary rooms; and to remedy the evil, he invented his well known chimney valve. The defects, however, of that valve, such as noise and emitting smoke into the room, have prevented it being generally adopted and other contrivances in which mica and talc valves are used have been tried with more or less of success. It is, therefore, with some degree of satisfaction that we record here a brief notice of the ventilation valve invented by Mr. D. Crossley of Brighouse, advertised in our last number, which seems to meet all the requirements of an efficient and satisfactory outlet for vitiated air. Mr. Crossley's valve has a neat, ornamental appearance and is remarkably sensitive in its action, and so noiseless as to cause no annoyance even in a bed-room. It can be easily fixed, or taken out if needful. It requires no oiling, and no attention, being perfectly self-acting and not liable to get out of order. It can be fixed in any room where there is a chimney, and it is highly spoken of by those who have tried it. We have no doubt that it would add greatly to the health and comfort of thousands of people, who are daily and nightly breathing vitiated air, and to whom the trifling expense would hardly be any consideration.

We have carefully inspected this self-acting valvular ventilator, and are satisfied that for cheapness, certainty of closing, noiselessness of action and efficiency, it cannot be approached by anything of the kind extant.

NOTICE TO CORRESPONDENTS.

DR. LONGSTAFF.—We were in error the week before last in saying that Mr. G. F. Chambers's 'Public Health Digest' was published by Knight. All Mr. Chambers's Public Health treatises are now published exclusively by Stevens and Sons, 119 Chancery Lane.

SANITARY PATENTS.

ABSTRACTS OF SPECIFICATIONS.

3851. Sewer or drain-pipes. G. A. F. Fowke.
The ends of the pipes are cut obliquely so that the series becomes a continuous splice.

3855. Water-waste indicators. R. H. Hughes.
The overflow water goes to a small water-wheel and rotates it. This wheel has projections which sound a bell or gong.

3900. Ventilators. G. Anderson.
This apparatus consist of (say) four vertical pipes round a centre, communicating at their lower parts with the space to be ventilated. Each is divided into two by a vertical partition set radially to the centre. There are four other partitions each midway between two pipes, also radiating from the centre, but stopping short of this. Facing these partitions are long vertical slits in the pipes for escape of foul air, and the approach to each slit is guarded by inclines to direct the air in the course most favourable to its escape and prevent the wind blowing into the pipes.

4099. Cleaning streets. W. A. Brodribb.
This consists in placing boxes for dirt and refuse in cavities at intervals in the gutters, and having mud-carts fitted with hoisting gear to raise such boxes and empty their contents into the carts.

4112. Treating animal and vegetable substances with hydrocarbons. J. H. Johnson.
This consists, first, in sending the vapour through the substances in one vessel, then washing and condensing the vapours in another vessel, and separating the purified hydrocarbon from the foul water previously to evaporising in the first vessel; secondly, treating substances with liquid hydrocarbon similarly; and thirdly, evaporating extracts, made from animal or vegetable substances, under a vacuum, so as to deprive them of all traces of the hydrocarbon.

4122. Apparatus for warming and keeping warm food for infants. J. Grout.
This consists of an annular metallic case coated with flannel fabric or the like; hot water is poured between the double sides through openings at the top, which are closed with screw caps. In the well—which is partitioned—bottles of infants' food are placed.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

BATEMAN, Mr. John, has been appointed Clerk and Surveyor to the Kirkby-Lonsdale Local Board and Urban Sanitary Authority, vice Reid, appointed Clerk and Surveyor to the Normanton Local Board and Urban Sanitary Authority.

FOWLER, Mr. Alfred M., has been appointed Engineer to the Corporation and Urban Sanitary Authority of Newcastle-on-Tyne.

GREEN, Mr. John, has been appointed Inspector of Nuisances for the Ellesmere Rural Sanitary District, Salop, vice Lloyd, whose appointment has expired, and Thomas, resigned.

HUTCHINSON, Valentine, M.D., Univ. St. And., M.R.C.S. Eng., L.S.A. Lond., has been re-appointed Medical Officer of Health for the No. 3 Sub-District of the Auckland Rural Sanitary District.

KILBURN, Wm. Byers, M.R.C.S. Eng., L.S.A. Lond., has been re-appointed Medical Officer of Health for the No. 2 Sub-District of the Auckland Rural Sanitary District.

MANSON, Richard Taylor, L.R.C.P. Edin., M.R.C.S. Eng., has been appointed Medical Officer of Health for the No. 1 Sub-District of the Auckland Rural Sanitary District, vice Mr. Kane, whose appointment has expired.

MILNE, Irvine Kempt, M.B., C.M. Univ. Aberd., has been appointed Medical Officer of Health for the Bradenham Sub-District of the Swaffham Rural Sanitary District, vice Clouting, deceased.

O'CONNOR, Martin, L.K.Q.C.P. Irel. and L.M., L.R.C.S. Irel., has been appointed Medical Officer of Health for the Chatteris Urban Sanitary District, Cambridgeshire.

PEASE, Mr. Cuthbert, has been appointed Collector and Inspector of Nuisances to the Kirkby-Lonsdale Local Board and Urban Sanitary Authority, vice Reid, appointed Clerk and Surveyor to the Normanton Local Board and Urban Sanitary Authority.

SWETE, Edward Horatio Walker, M.D. Univ. St. And., M.R.C.S. Eng., L.S.A. Lond., has been appointed Public Analyst for Droitwich for two years.

WILSON, John, L.R.C.P. Edin., L.F.P.S. Glasg., has been re-appointed Medical Officer of Health for the Stockton Rural Sanitary District, at 200*l.* per ann.

VACANCIES.

ALTOFTS LOCAL BOARD AND URBAN SANITARY AUTHORITY, Yorkshire. Clerk: 30*l.* per ann.

AUCHTERARDER, Perthshire. Certifying Factory Surgeon.

BELPER URBAN SANITARY DISTRICT, Derbyshire. Medical Officer of Health: 25*l.* per ann. Application, 8th instant, to Joseph Pym, Clerk to the Authority.

HANDSWORTH LOCAL BOARD AND URBAN SANITARY AUTHORITY, Staffordshire. Surveyor: 300*l.* per ann. Application, 13th instant, to Henry Ward, Clerk, Church Street, West Bromwich.

HONITON URBAN SANITARY DISTRICT, Devonshire. Medical Officer of Health: 20*l.* per ann. Application to the Town Clerk.

NEWBOLD AND DUNSTON URBAN SANITARY DISTRICT, Derbyshire. Inspector of Nuisances: 20*l.* per ann. Application, 3rd instant, to J. G. Young, Clerk to the Authority.

RADNORSHIRE. Public Analyst: 21*s.* per analysis and travelling expenses when attending to give evidence. Application to the Clerk of the Peace, Presteign.

SHIPLEY LOCAL BOARD AND URBAN SANITARY AUTHORITY, Yorkshire. Assistant Surveyor: 120*l.* per ann. Application, 6th instant, to John Chambers, Clerk, addressed to the Chairman of the Street and Drainage Committee.

TAMWORTH RURAL SANITARY DISTRICT, Staffordshire. Medical Officer of Health: 120*l.* per ann. Application, 11th instant, to John Shaw, Clerk to the Authority.

WHITTINGTON LOCAL BOARD AND URBAN SANITARY AUTHORITY, Derbyshire. Medical Officer of Health. Inspector of Nuisances. Election 7th instant. Collector: 12*l.* per rate. Application, 6th instant, to Henry T. Twelves, Clerk.

WINSLOW RURAL SANITARY DISTRICT, Buckinghamshire. Medical Officer of Health.

NOTICE.

THE SANITARY RECORD *is published every Friday morning, and may be ordered direct from the Publishers. Annual Subscription, 17s. 4d.; free by post, 19s. 6d.*

Reading Covers to hold 12 numbers of THE SANITARY RECORD *have been prepared, and may be had direct from the Publishers or through any Bookseller, price 3s.*

Original Papers.

THE INSANITARY CONDITION OF MILKSHOPS, AS BEARING UPON THE DISSEMINATION OF DISEASE.

BY ERNEST TURNER, F.R.I.B.A.

(*Continued from page* 71.)

AT a milk-shop in a lane down East, which bears a rural name, I was told, whilst examining the drainage, 'We never smell anything bad from our own drains, but those next door are sometimes so bad that we can smell them all over the house, and it nearly makes us sick.' On inquiring why they didn't give notice to the parish, they said they didn't dare, as it would be found out they had made the complaint, and the people next door were 'such an awful low lot there was no knowing what they might do to spite them.'

In London generally again, the removal of dust does not appear to be managed as it is desirable that it should be. I visited a small milk-shop in one of the lowest quarters which seemed to be much cleaner than many in better streets. In the back yard there was an offensive smell I could not at first account for; but on looking over the wall, I saw a large heap of dust, and was told by the woman in the milk-shop that to her knowledge none had been removed for a twelvemonth; she had then, at the request of the landlord, given the dustmen sixpence to take it away. She complained that the dustmen would often refuse to remove dust unless they had beer given them, and as I have frequently heard the same complaint, have no doubt this accounts for many of the pestiferous heaps one so frequently smells in walking through by-streets. Local boards are much more energetic than formerly, but this is a matter in which they have full power, and which requires their serious attention. In some of the narrow courts there is a common dustbin for all the houses, which seems to be used by every occupant, and the dust is removed every day. This seems in such neighbourhoods a far better arrangement than that by which removal depends first upon the tenant calling the dustman, and secondly upon their being able or willing to 'tip' him.

Such instances as these show the necessity for occasional inspection of all houses, at any rate all under a certain rental, or let out in tenements. Should anyone doubt the practicability or expediency of such a practice, I refer them to the town of Brighton, where I have myself been the rounds with the inspectors, have seen both the necessity for and the advantages derived from the inspection, and have found that the officials are generally welcome visitors. In Hackney also all houses under a rental of 26*l.* per annum are visited by the sanitary inspectors. Dr. Tripe, in his report for the year 1874, called attention to the necessity for house to house inspection, and showed that out of the total 6,110 nuisances discovered in the year, only 466 were abated on complaint sent to the office or otherwise made to the inspector. A repetition of instances, which I could give by the dozen, where there exists one, more, or all of the defects I have mentioned, would be tedious and to no purpose. My object will have been gained if I have shown the urgent necessity for stringent regulations with respect to the milk trade, and if I can assist in pointing out the probable dangers of milk becoming contaminated, thus injuriously affecting the health of the community, and frequently becoming the medium of dissemination of the most fatal diseases. That this is no alarmist's cry—no storm in a milk-jug—will, I am sure, be fully endorsed by the medical officers of health and other members of the medical profession, who have given attention to the subject, and so kindly and courteously rendered me every assistance. I have given no exaggerated account of existing sanitary defects, and this will be fully borne out by the sanitary inspectors.*

To sum up, then, let us consider the chief points demanding attention in the transport and storage of milk and the general arrangements, management, and construction of shops where milk is sold. With respect to the transit, two provisions are necessary. In the first place, the old-fashioned churns used for this purpose, and ingeniously devised to collect dust and molecular impurities of all sorts, which are necessarily washed into the churns by any passing shower of rain, should be abolished, and replaced by those with an inner, close-fitting lid, and an outer hinged lid overhanging the top rim of the churn.†

In the second place, it would be well if more sampling were done at railway stations, and means taken to render the consignor of the milk responsible for its delivery pure at the station. A short time since a prosecution under the Adulteration Act failed, owing to an inability on the part of the parish to prove that the milk had not been adulterated in transit. Morning milk in London that comes from the country is from cows milked about six o'clock the previous evening, sent by trains arriving from ten to twelve o'clock at night. It is fetched by retail vendors from the station on arrival, taken home and so practically remains in the shop in open vessels all night to be sold over the counter or taken to customers in the morning. Here is *great* danger of contamination in the smaller shops. It will be observed that Mr. Sclater-Booth's bill now in Parliament divides the permissive power to make by-laws under four heads. No. 2, section 69, says, 'With respect to the cleanliness of *milk-shops*.' This appears to give a loophole for the chandler's shop, as some ingenious lawyer would probably make a case of 'What is a *milk-shop*?' An altered wording—shops or places where milk is kept or sold—would probably forestall the question.

All milk should be kept in rooms or inclosures specially set apart for the purpose, where nothing else should be allowed to be placed or stored. No water-closet, dust-bin, refuse or dung-heap should be within a certain specified distance.‡

* It is a good sign to see the men employed as inspectors more intelligent and enlightened than formerly; probably the examinations to be held by the Sanitary Institute of Great Britain, and certificates to be granted will stimulate the men, raise their social status, and be a great benefit to the public.

† Some time since a well-known analytical chemist observed a number of milk churns standing outside one of the railway stations, just over the largest dung wharf in London, and the lids of the churns were covered with the dust.

‡ Mr. Simon, in his reports to the Local Government Board, has spoken of the non-removal of refuse matter from inhabited places as a cause injuriously affecting public health, as a conspicuous and gigantic evil, and one which claims the earliest attention of the Sanitary Government of England, Mr. Simon regards uncleanliness as the deadliest of our present removable causes of disease. He says: 'In order to reduce that vast quantity of preventable disease, which has its type in enteric fever, and in relation to which each individual case

I cannot agree with the recommendation of the medical officers of health on one point, namely, as to the entire abolition of underground vaults. On the contrary; I believe if properly constructed, drained, ventilated, etc., they are well suited to the purpose, and an even temperature more easily preserved. But no basement should be licensed for the storage of milk or for purposes connected with the trade, which is not entirely devoted to the purpose, and no water-closet or dust-bin should be allowed.

It is matter for grave consideration whether milk should be allowed to be sold without a license, nor would this, probably, appear too restrictive a measure, provided the licenses were issued by the sanitary authority at short intervals.

No person should be allowed to sleep in any place where milk is sold or stored, or in any room communicating with such place.

No place for the sale of milk should be licensed unless there is a separate entrance, so that the family or lodgers have not necessarily to pass through the shop.

The floor and walls should be of smooth impervious material. Nothing appears better than asphalte for the former, and glazed bricks or tiles for the latter.

All shelves, tables, etc., upon which the vessels are placed should be of slate, glazed tile, iron, or other non-absorbent material.

Sufficient and approved means of ventilation at all times should be provided to every portion of the premises.

All drains should be of glazed earthenware pipe, or other approved material, laid on concrete, with water-tight joints, and proper means of ventilation, flushing, and convenient mode of access for examination provided.

The drainage of the floors should, as far as practicable, be surface drainage, discharging outside the walls in the open air, over trapped gullies, and any waste-pipes should discharge in the same manner.

The drains conveying waste water should not be connected with any house or other drain conveying soil, but should have an independent connection with the sewer.

A proper place should be provided for washing the cans and other vessels, with ample storage-room for the whole number employed, where the same principles as to ventilation and drainage should be observed.

The vessels in which the cans are washed should be used for no other purpose.*

An apparatus of sufficient size should be provided for boiling water which should be situated in the room for washing the cans, or other approved position.

No cans or other vessels used in the trade should at any time be placed or stored in any passage or room other than that specially provided for the purpose.

Where there is not a constant water-supply a slate cistern of ample capacity, placed in an approved position, properly covered and without overflow except as warning pipe, should be provided, and the said cistern should be used for the storage of water for all purposes connected with the trade, and should not supply the water-closets or be drawn from for household purposes. It should be provided with means for effectual cleaning and be thoroughly cleaned once a month.

The most scrupulous cleanliness should at all times be observed in all parts of the premises, and all floors, shelves, tables, etc., should be thoroughly washed down once a day.

Every churn, can, or other vessel in which milk or cream is received or sent out should be thoroughly washed and scalded before it is again used.

Every vessel in which milk is placed for sale over the counter, and every vessel in which milk is set for cream should be emptied, washed, and scalded once in every twenty-four hours.

Vessels, containing milk, standing on shop-counters or other places exposed to dust, should be kept covered with a lid of muslin, 'strainering,' or other approved material.

No vessel that is used for the purpose of containing or baling out milk should on any consideration be used for any other purpose.

Regulations should be made as to persons serving milk, and suffering from any infectious disease, or having been in contact with others so suffering; but these pertain strictly to the medical profession, and will be better treated at the hands of medical officers of health.

Without wishing to advocate too arbitrary laws, we shall, I think, be going backward in civilisation if we forget the old Ciceronian injunction, 'Salus populi suprema lex esto;' and whilst admitting that every opportunity should be taken for diffusing information on sanitary matters, the educational problem must to a certain extent be solved by legislation. Take, for instance, the Vaccination Act. Will any sensible observer assert that, even supposing the benefits of vaccination could have been made plain to the people without the machinery of the law, the dreadful scourge of small-pox would have been reduced to the extent statistics conclusively prove to have been the case?

One great want seems prominently to assert its importance at every turn, and, if supplied, would enable sanitary authorities to do much toward checking the communication of disease and limiting the area of epidemics. I mean an Act for the registration of infectious diseases. Lord Beaconsfield remarked only the other day, 'The health of the people is, in my opinion, the first duty of a statesman.' I think I may confidently say that those who devote attention to questions affecting public health are unanimous as to the expediency of such an Act, and that the only difference of opinion is on matters of detail.

It would be unfair, before closing this paper, not to state that some of the larger dealers in milk have lately done their best to render their premises what they should be, and have taken precautions to ensure purity of the milk. But pre-eminent among London dairies stands the Aylesbury Dairy Company, Limited, whose chief establishment at St. Petersburgh Place, Bayswater, may be taken as a type of what a milk store ought to be. The buildings of the company cover nearly an acre of ground,

of enteric fever which arises, ought to be regarded as having an important local significance, the one essential condition is cleanliness. That local sanitary authorities proceeding to act upon this principle, with a clear intelligence of what cleanliness really means, and with a sincere resolution to enforce it in their respective districts, can within a few years reduce, by some tens of thousands the annual mortality of England, is, I think, at least as certain as that such ought to be the aim of their existence.'

* I have seen them used for washing dirty linen.

and have all been specially erected for the requirements of the trade. All portions of these buildings, in which milk or its products, cream and butter, are sold or stored, are constructed of impervious materials—glazed bricks and tiles for walls and ceilings, asphalte or closely-jointed flagging set in cement for floors, tin for vessels, and marble and slate slabs upon galvanised iron stands for all tables and shelves—with ice-tanks holding ten tons of ice, through which all water for butter-making, etc., is drawn. This company passes as much some days as 3,000 gallons of milk through their dairy. To say that a complete organisation for checking the quality of the milk as it is received from the farms exists is unnecessary, because the large capital embarked in this undertaking renders this a matter of course, and that equal care is taken with all milk that is sent out is also a necessity. Indeed, although a standard of 10 per cent. of solids has been admitted by the Select Committee of the House of Commons, the Aylesbury Dairy Company maintain a standard of 12 per cent. Every churn of milk, 'inwards and outwards,' is sampled, tested, and the result recorded by the company's own officers, and a large number of complete analyses per week are made for the company by an eminent chemist. To guard against malpractice by the 'carriers,' the company maintain a staff of inspectors, non-commissioned officers of the army, retired on pensions, who are constantly in the streets, and who meet the milk-carriers at unexpected points, and take samples of the milk as delivered at the houses of customers. But it is not the actual quality of the milk supplied in London that we are now investigating, but sanitary or unsanitary condition of the milk, and the sources from which it is obtained and the places in which it is sold and stored—and it is especially on these points that the system, organisation, and power of this large corporation is seen and appreciated. Milk is received from some sixty different farms. That these farms may be known to be in good sanitary order, the company employs a general medical inspector who from time to time visits and reports upon the farms and upon the care taken in carrying out the regulations imposed, and also an inspecting engineer of great experience in sanitary matters who in the course of his visits supervises the water-supply, drainage and other details of dairy hygiene. He makes a plan of the dairy premises of every farm. That these are no idle precautions is proved by the fact that during the last few months, the supply of milk from two farms has been suspended, owing to unsatisfactory sanitary arrangements. The construction of the buildings in London, as already described renders further comment on this head unnecessary as regards their sanitary condition. One of the greatest dangers that exists in London, however, is the employment of persons in dairies, who, from the wretched dwellings in which they live, may at any moment carry infection to the houses they supply in their daily rounds. This company, fully recognising this great risk, and in order to effectually control the sanitary conditions of their staff, have erected a series of dwellings separate from, but close to their business premises in which they can lodge twenty-five married men, with their families, and thirty to forty single men. These dwellings are constructed with every care as to sanitary arrangements, spacious wash-house and laundry, with convenience for drying, and unlimited supply of hot and cold water are provided; also bath rooms, where for the sum of one half-penny any one in their employ can obtain a hot or cold bath. The whole of the *employés* of the company at their Bayswater establishment—over one hundred—are placed under the supervision of a local surgeon. I visited these premises for the purpose of finding defects, but confess that I found them a model of good arrangement and management, and recommend medical officers of health or others interested in the subject to see them.

PENZANCE AS A HEALTH RESORT.

AT a meeting of the South Western Branch of the British Medical Association, held at Penzance, under the presidency of Mr. J. B. Montgomery, M.D., F.R.C.S., etc., the President referred, amongst other things, to the healthy climate of West Cornwall, and of Penzance in particular, which possesses so many advantages as to claim for itself great value as a sanatorium. He said that—

'From a very remote period in the treatment of diseases the efficacy of change of climate and change of air have been regarded by medical men as remedial agents of the utmost value. In no class of diseases have these agents been considered of greater value than in the treatment of chronic affections of the pulmonary organs, phthisis especially. In the treatment of this disease the selection of a climate where consumption is unknown does not seem necessary. From the discussion that has from time to time appeared in our medical journals—change, absence from old habits and associations, seem the principal objects, combined with removal to a climate where the atmosphere is of a mobile character; where there are no great extremes of temperature either in summer or winter, or great variations between the day and the night; and where, even in the depths of winter, the patient may reasonably expect almost daily exercise in the open air. For such advantages Penzance has long enjoyed a reputation. Its situation—almost as if built on a small island, washed by a great oceanic current of hot water from the equatorial regions—permits an evenness of temperature not to be equalled by places similarly situated as to latitude but differently placed as to distance from the sea, whether on a continent or large island. Objection has been raised on account of its humidity; but, as our historian, Dr. Borlase, says, "Our rains in Cornwall are rather frequent than heavy or excessive; and we have very seldom a day so thoroughly wet but that there is some intermission; none so cloudy but that the sun will find a time to shine." Touching the temperature of Cornwall, Carew says, "The air thereof is cleansed as with bellows, by the billows and flowing and ebbing of the sea, and there through becometh pure and subtle, and by consequence healthful."

'It is not my intention to inflict on you a number of meteorological observations; I would simply quote from the exceedingly accurate published observations of Mr. W. Hosken Richards, of this town, for the last sixteen years. Mr. Richards remarks:—"The temperature-tables show much equability. The lowest registered was 23 degrees, on one occasion, and the highest 78½ degrees, also on one occasion. The rainfall and winds afford interesting comparison with each other: the total of the former show a yearly average for this district of about 43 inches, and the driest year (1864) was marked by a prevalence of

east winds; nevertheless, south-west winds predominate; hence the mildness of the climate. And, after the average given, we may venture to say also, notwithstanding the common impression to the contrary, that the moisture is not extreme."

'It is an exceedingly difficult matter to form an opinion of the comparative merits of different health resorts in the treatment of phthisis. The difficulty of forming any kind of statistics is great, especially in private practice. The various forms and also the varied stages of the malady at which patients arrive —some early, some so far advanced that it is often a wonder they were even permitted to leave their homes, some coming here direct, others after trying many places at home and abroad. Without being able to afford you any positive figures I would say, as the result of many years' observation, that, when the patient has come here at an early stage of phthisis, the result of residence has been in many cases a marked improvement in his condition, in some cases even I would almost say a perfect recovery.'

In speaking of the sanitary progress of the above town, Mr. Montgomery stated that, 'Amongst the numerous important subjects which at different times have engaged the attention of this association—such as sanitary organisation, state medicine, compulsory vaccination, the care of habitual drunkards, the remonstrances with regard to the Vivisection Bill—it may well take credit to itself for its exertions in connection with the Public Health Act. As a sequent, new duties have been imposed on the medical man—the duties of sanitary officer. Whether these duties can be efficiently discharged by a medical man in active practice, and with the many difficulties and obstructive interests he has to combat in his own town or neighbourhood, or whether the country generally should be divided into districts, each under the superintendence of a specially-trained medical man, are matters which the Government of this country must hereafter decide. Still, in possession of such knowledge as the germ theory of disease, the cause and spread of epidemic and endemic diseases, etc., it becomes the incumbent duty of each of us, as opportunity occurs, to aid our sanitary officers, by hunting out their causes and reporting their presence. Even if we cannot stamp out the disease, much may be done to prevent its spread. Also, in our daily visits, by demanding the prompt removal of nuisances, by endeavouring to prevent overcrowding, by inculcating lessons of cleanliness, by seeing to the purity of the water-supply, the proper trapping of drains and closets, much may be done to improve the health and resisting powers of our patients. Penzance has a perfect system of sewers, emptying into the sea below low-water mark; and is also liberally supplied with pure water, brought in pipes from large reservoirs in the neighbourhood.'

We would remind our readers that Penzance is one of the most beautiful and flourishing of our watering-places; is situated on the west side of Mount's Bay, and faces St. Michael's Mount and the Lizard, and is ten miles from the Land's End. As a town and port it is farther west than any other on the mainland of Great Britain, and stands on a healthy and mild slope, overlooking the expansive bay, from which the houses rise in terraces above the Esplanade. It offers attractions to the artist as well as to the tourist; and for the invalid the climate as a health-resort is invaluable. All that is desirable to bring it into popular favour is greater and speedier railway accommodation.

Hotel and lodging-house accommodation is very good—suitable to every taste, and to the capacities of every pocket. Excellent bathing accommodation is also afforded, and what is of importance is, that it possesses a quiet beach and promenade. To those who are fond of the salt water, a host of advantages are given in the shape of pleasure boats for afternoon sails upon the Bay, or a pull across to the adjoining fishing villages of Newlyn and Mousehole, and St. Clement's Island, or the noted St. Michael's Mount, which is beautifully situated near the little town of Marazion, the abode of Sir J. St. Aubyn, M.P. To those who wish to go further at sea, they will find ample provision for visitors at the Scilly Islands, forty miles distant, which isles are connected with the mainland by telegraphic communication. The principal island (Tresco) is the residence of the lord-proprietor of the isles, contains some beautiful gardens, with tropical plants, and, in fact, collections of plants and trees from almost every part of the world. There are two steamers, owned by the West Cornwall Steamship Company, which run to and from Penzance on alternate days, the average trip occupying about four hours. For those who do not like the sea, wagonettes and other conveyances run daily to places of interest in and around the neighbourhood, including the Logan Rock, and the Land's End; the vehicles, on their way skirting the Bay, thence through country lanes until they reach the famous Logan Rock; from there those conveyances generally proceed to the Land's End, where the views are very fine and impressive; also a glimpse of the new Longships Lighthouse, close to the rock on which the old one (now removed) stood, which braved so many furious gales. From the cliffs, the Scilly Islands (between twenty-five and thirty miles distant), are discernible on a clear day. Those fond of strolls can enjoy themselves to their heart's content, for there are numerous pleasant walks and points of view in a pleasant country; and when once there, the visitor will find this Cornish seaport much livelier than his anticipations, perhaps, have led him to expect.

We are pleased to say the town of Penzance is sufficiently known to, and appreciated by, winter as well as summer tourists, and invalids have found out its natural qualities.

THE
SANITARY RECORD.
FRIDAY, AUGUST 10, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

THE PUBLIC HEALTH IN THE PAST QUARTER.

THE Registrar-General's Quarterly Return relating to the three months ending June last, puts us in possession of the vital statistics of England and

Wales for the second quarter of this year. This return is much more than a mere statistical report of births, deaths, and other recorded facts, it is a more or less complete bulletin of our health and social condition.

The declining marriage-rate of the first quarter of this year undoubtedly reflects general commercial depression; the annual marriage-rate, which in the March quarters of 1875 and 1876 had been equal to 14·4 and 13·8 per 1,000, further declined to 13·1 in the first three months of this year. Pauperism, however, continues to decline, although at a slower rate than has prevailed in recent years. The proportion of emigration, too, is almost unprecedentedly low, which, if not evidence that the working classes of this country are prosperous and contented, at least shows that the chances of improving their prospects abroad are not sufficiently tempting.

With regard to the prices of the necessaries of life, it appears that while the price of wheat has been artificially forced up on the pretext of the Russo-Turkish war, meat is somewhat cheaper, and the price of coals unusually low.

The birth-rate in sympathy with the decline in the marriage-rate has also declined. During the three months ending June last the annual birth-rate in England and Wales was equal to 36·5 per 1,000, and was nearly 1 per 1,000 below the rate in the corresponding period of last year; the rate, however, exceeded by 1·3 per 1,000, the mean annual birth-rate in the second quarter of the thirty-eight years 1838–75. The recorded birth-rate in the various counties of England ranged from 26·6 in Dorsetshire, to 45·7 in Durham. In the twenty large English towns the birth-rate last quarter averaged 37·1 per 1,000, and ranged from 31·3 in Brighton and Plymouth, to 47·2 and 48·8 in Oldham and Salford. In fifty other large town districts the birth-rate averaged 38·1 per 1,000; it was but 23·4 and 25·8 in Cheltenham and Bath, whereas the rates in St. Helen's and Barrow-in-Furness was equal to 49·1 and 52·4. The birth-rate in a population, it is pointed out by the Registrar-General, depends upon the proportion of married women living at the child-bearing ages. Hence the low birth-rates in Cheltenham and Bath are due to the small proportion of married women living in those towns at the ages fifteen to forty-five. In favourite residential neighbourhoods, and in the suburbs of all large towns, the large proportion of domestic servants has the effect of considerably reducing both the recorded birth-rate and death-rate.

The mortality statistics form, perhaps, the most important part of the Registrar-General's quarterly return. The deaths registered in England and Wales during the three months ending June last were equal to an annual rate of 21·5 per 1,000 of the estimated population in the middle of the year. This rate slightly exceeded the average rate in the corresponding quarter of the ten years 1867–76. The low temperature which prevailed during the greater part of April and throughout May, following as it did an unusually mild winter, was the probable cause of the excess of deaths during last quarter. The mortality from diseases of the respiratory organs, especially among elderly persons, showed a considerable excess.

Since civil registration was established in England, there has been a considerable increase in the relative proportion of the male death-rate to the death-rate among females. According to the English Life Table, in equal numbers living the deaths of males (at all ages) are somewhat less than 105 to 100 deaths of females. During last quarter the annual death-rate among males was equal to 23·1 per 1,000, whereas that among females did not exceed 19·9 per 1,000; thus in equal numbers living the deaths of males were as 116 to 100 deaths of females. In urban populations the relative excess of the male death-rate is still more marked. In Lancashire, for instance, the death-rate of males to that of females was as 121 to 100, and in the West Riding of Yorkshire as 123 to 100.

Although the age-distribution of urban populations should give lower rates of mortality than that of rural populations, town death-rates are invariably higher than those in country districts. This excess is due to unfavourable sanitary conditions, induced by aggregation of population and neglect of the laws of health. During last quarter the death-rate in the principal English urban population, consisting of about 14,000,000, averaged 22·7 per 1,000, whereas in the remaining and mainly rural population of about 10,500,000, the death-rate did not exceed 19·7 per 1,000. Each of these rates exceeded the average for the corresponding period in the preceding ten years; the excess was, however, comparatively largest in the country districts, where sanitary progress proceeds more slowly than in towns. In the twenty large towns, including London, with an estimated population of about 7,000,000, the death-rate averaged 23·4 per 1,000, and ranged from 16·7 and 18·2 in Portsmouth and Brighton, to 31·7 and 33·5 in Salford and Oldham. The present population of Salford is said to considerably exceed that estimated by the Registrar-General; there is therefore no trustworthy basis for calculating its death-rate. It is mentioned, however, that no less than 21 per cent. of the deaths registered within this borough last quarter were due to the seven principal zymotic diseases, whereas the proportion in the twenty large towns averaged less than 14 per cent. In the fifty other large town districts the death-rate of the quarter averaged 22·4 per 1,000, and while it did not exceed 15·7 in Dover and in Yarmouth, it was equal to 29·1 in Wigan, 31·6 in Exeter, 32·3 in Ashton-under-Lyne, and 32·8 in Newport (Monmouth).

With regard to infant mortality, the deaths of children under one year of age were equal to 132

per 1,000 births registered, corresponding with the average proportion in the second or spring quarters of the seven years 1870–6. In the principally agricultural counties of the south-midland division, the rate of infant mortality, measured in this manner, did not exceed 108 per 1,000 births, whereas it was equal to 152 per 1,000 in Lancashire, and 174 in Monmouthshire. In the twenty towns the proportion of infant mortality averaged 145 per 1,000, and while it was but 109 and 114 in Plymouth and Portsmouth, it ranged upwards to 170 and 194 in Oldham and Liverpool. In some of the other Lancashire towns the rate of infant mortality was still higher, and was equal to 214 per 1,000 in Blackburn.

Among persons aged upwards of sixty years the rate of mortality last quarter showed the largest excess; it averaged 74·0 per 1,000 in England and Wales, which was 5·1 per 1,000 above the average death-rate among persons living at these ages in the seven preceding corresponding quarters. In town populations, the largest excess occurs in the death-rate of elderly persons. In the twenty large towns, the death-rate among persons aged upwards of sixty years averaged 79·2 per 1,000 last quarter; and while it was but 55·8 and 71·5 in Brighton and Leicester, it ranged upwards to 98·7 in Manchester, and 111·5 in Oldham.

To the seven principal zymotic diseases—small-pox, measles, scarlet fever, diphtheria, whooping-cough, fever, and diarrhœa—14,721 deaths were referred in England and Wales during last quarter. These deaths were equal to an annual rate of 2·4 per 1,000, which was 0·4 per 1,000 below the average zymotic rate during the corresponding quarter of the seven years 1870–76. In the agricultural counties of Buckingham and Hereford, the zymotic rate last quarter but slightly exceeded one per 1,000, whereas it was equal to 3·6 in Lancashire, and was so high as 7·2 in Monmouthshire. In the twenty towns, the rates from these diseases averaged 3·2 per 1,000, and ranged from 1·2 and 1·3 in Nottingham and Brighton, to 4·2 and 6·6 respectively in Oldham and Salford. In the fifty other large town districts, the average zymotic rate was 2·9 per 1,000; and while the rate did not exceed 0·6 and 0·7 in Yarmouth and Coventry, it was equal to 5·6 in Wigan, 5·7 in Cardiff, 64· in Barrow-in-Furness, 8·9 in Exeter, and 12·8 in Newport (Monmouth). Scarlet fever was fatally prevalent in Wigan and Exeter, measles in Cardiff and Newport, and the excessive zymotic rate in Barrow-in-Furness was due both to measles and scarlet fever.

Whooping-cough was the most fatal zymotic disease last quarter, owing in great measure to the low temperature and cold winds which prevailed throughout the greater part of the spring. Scarlet fever, although it showed fatal epidemic prevalence in many localities, caused 1,844 fewer deaths than in the first quarter of the year; indeed, the death-rate from this disease was lower than in any quarter since the second of 1873. The death-rate from measles corresponded with that from scarlet fever, and slightly exceeded the average rate for the season. Unusually severe epidemics of measles prevailed, however, at Bath, Worcester, Barrow-in-Furness, Tredegar, Newport, and Cardiff.

The fatal cases of fever, principally enteric, continue to show a marked decline; the death-rate from this disease last quarter was no less than 28 per cent. below the average rate which prevailed in the corresponding quarters of the seven years 1870–6, and did not exceed 0·36 per 1,000 persons living in England and Wales. In the agricultural counties of the eastern division the death-rate from fever did not exceed 0·22 per 1,000, whereas it was equal to 0·54 in Lancashire and 0·56 in Durham. In the twenty large towns it averaged 0·37; it was but 0·11 and 0·13 in Bradford and Nottingham, and 0·29 in London, while it was equal to 1·15 in Bristol. In the fifty towns the fever-rate averaged 0·42 per 1,000; it exceeded one per 1,000 both in Shrewsbury and Rochdale.

The deaths from small-pox which had been 1,943 during the first quarter of the year, declined to 1,416 in the three months ending June last; of these, 904 occurred in London and its suburban districts, 315 in Lancashire, 86 in Cheshire, and only 111 in the rest of England and Wales. These fatal cases of small-pox were equal to 831 per million living in Greater London, 405 in Lancashire, 590 in Cheshire, and did not average more than 27 per million in all other parts. No fatal case of small-pox was registered in twelve English counties, or in ten of the twenty largest towns. The disease, therefore, which has been fatal in London and in some parts of Lancashire, has not become generally epidemic, and its prevalence is now showing a general decline.

The present return contains the usual information relating to the spring mortality statistics of the registration districts and sub-districts that contain the principal inland and sea-side watering-places, which become holiday resorts at this time of the year. The area taken to represent these 46 watering places is estimated to contain a population of about a million of persons, among whom the death-rate averaged only 18 per 1,000, and ranged from 11 in Lyme Regis, and 13 in Margate and Eastbourne, to 24 in Whitby, 25 in Southport and Rhyl, and 27 in Llandudno. Too much importance should not, however, be attached to the death-rate from all causes in some of these small places during only the quarter of a year, but the facts bearing upon the activity of zymotic disease in these places should be studied by those who are now debating as to the choice of a holiday resort.

Such are the main features of the Registrar-General's quarterly return just issued, which may on the whole be considered satisfactory. The slight excess in the death-rate is mainly due to the decease of elderly persons, who survived the winter in conse-

quence of its exceptional mildness. Zymotic fatality was below the average, the small-pox epidemic, at one time threatening to become general, showed a marked decline, and conclusive evidence of general sanitary progress is afforded by further marked decrease in the mortality from enteric fever, and the all but disappearance of typhus.

BATHING AND DROWNING.

'FORTY-SEVEN bathing accidents registered within the metropolitan area during the last four weeks,' is the burthen of one of our latest reports, and deserving of serious consideration.

The average destruction of life in these islands from drowning now reaches over 4,200 per annum, an item of some importance, even amidst the appalling aggregate of human misery and preventable suffering, which ignorance and indifference perpetuate in this densely populated country. The figures are due far less to fatalities in country places, where some little choice of safe spots in ponds and streams exists, than to deaths in the great towns of Britain, where the natural or accidental opportunities for bathing have not been properly utilised or adapted to the increasing wants of the locality. In the metropolis especially, our rivers, canals, and lakes are, as a rule, closed against bathers, and police supervision is exercised, not in regulating and promoting, but in stamping out the healthy desire of the poorer classes for cold bathing. Those who understand the action of cold bathing on the skin, and its natural functions, those who know that in India and in other tropical climates, bathing is often religiously recognised as a necessity of healthy existence, can understand how and why humanity hungers for cool bathing in summer, even in these latitudes. But this want, so urgent for three months of the year in England, is comparatively unfelt during the remaining nine, and those who have the power to legislate in the matter are not urged to action by personal cognisance of the cruel necessity for effort which exists. Men who, as a rule, enjoy their tub every morning, and their annual visit to the seaside in autumn, can only become earnest performers in such matters under a high sense of duty.

We have striven to do justice on former occasions to what our parish authorities have accomplished in the building of baths and washhouses, but it is evident that the poorest classes are not reached by these establishments. Indeed, nothing but the gratuitous provision of safe open-air bathing places, will meet the want; the only condition exacted for the privilege being orderly conduct and language, under police supervision.

In the SANITARY RECORD of June 15 last, a graphic description was quoted of the grateful appreciation of bathing in Victoria Park, shown by thousands of the class who are christened the 'great unwashed,' by the very men who are guilty of their condition. A popular French writer, M. Taine, once declared it a characteristic of England that, whenever anything 'had to be done,' men were found ready to do it. Though proud of the compliment implied, we are bound to confess that it is not always those who have the will who possess the power in such cases. The conservatism of selfishness offers obstruction greater than the pollution of any Augean stable to reformers.

We have before us a modest circular of the School Board for London, signed by Charles Reed, John McGregor, Messrs. Currie, Rogers, Baker, Steller, Scutton, Lingham, Beck, Glover, and Jane Agnes Chersar. It shows that during the last two seasons, by arrangements with twelve public baths, and with the Government authorities of Victoria Park, 6,000 children and teachers, including sixty female teachers, were enabled to learn how to swim, 'not one accident occurred, and the boon was gratefully enjoyed.' They solicit pecuniary aid to further their efforts.

We wish these workers every success, but to meet the difficulty fairly and effectually, to ensure safe, open-air bathing places throughout London, the matter must be taken up by the Vestries in general, and the Metropolitan Board in particular. There are doubtless men in these bodies capable of the effort.

Much self-sacrifice will be necessary before the work is accomplished—much of quiet and devoted persistence, careless of recognition or reward, but simply faithful to the performance of honorary and voluntary duty. When facilities are supplied, then as a natural consequence, swimming will become a branch of national education, and the production of certificates of proficiency in it be made compulsory in connection with every public examination.

ENDEMIC OF DIPHTHERIA AT BROMLEY.

IN 1874, Dr. Baylis, the medical officer of health to the Bromley Urban Sanitary Authority, reported that the rapid increase in the number of houses and population had outstripped the public provisions necessary to health, or for freedom from endemic disease, and pointed out the necessity for a proper system of main drainage, as the soil was getting charged with putrefying liquids. He also insisted on the necessity of making a systematic inspection of the poorer houses. The latter has been carried out, but the former has not, because there is no outfall for the sewage, nor can there be until the West Kent drainage scheme, which was promoted by the board, and now being carried out, is completed.

The history of this epidemic or rather endemic is instructive, as showing the extreme difficulty in checking the progress of this disease when it has once broken out from a local cause. In a special report presented to the local authority in November, 1876, Dr. Baylis stated that the outbreak first occurred in the Tylney Road district, in consequence of large cesspools and unventilated drains existing there, and that the disease was extending to the rural districts by means of school children. From Tylney Road it

spread from place to place up to the end of April, when the endemic had apparently ceased. Dr. Baylis reported that as many as ninety-four persons had been attacked and twenty-four died. He also stated that all these cases were supervised by him, and that all the infected dwellings were cleansed and limewhited, but apparently not otherwise disinfected. He recommended that the cesspools should be emptied under the control of the inspector with the free use of disinfectants; that the house-drains should be disconnected from the cesspools; that the privies should be ventilated, and other means adopted for temporarily abating the nuisances caused by the want of proper main-drainage. These recommendations, if properly carried out, have not been successful in preventing a fresh outbreak, as in the week ending July 14 last, as many as three deaths from diphtheria were registered in Bromley and New Bromley.

There is one defect that often occurs in newly constructed houses, which within our knowledge has caused diphtheria, viz., the connection of a rain-water pipe with the sewer, in such a way that the sewage gases are brought close to a bed-room window. This sometimes happens from the head of the pipe being near the window, but in several cases the gases obtained an entrance through a branch pipe which had been made to carry off the rain water from the top of a portico or bay window. The evidence in these cases was furnished by the attacks being confined to persons who successively inhabited the room adjacent to the opening. As this cause is frequently overlooked, it is as well to examine the joints and openings of the rain-water pipes whenever illness of any kind likely to be caused by sewer gases occurs amongst those who sleep or live in rooms adjacent thereto.

Notes of the Week.

THE Bristol Town Council have arranged to borrow a sum of 195,000*l.* for the purpose of carrying out an extensive scheme of street improvements.

MR. ALFRED M. FOWLER, borough engineer of Salford, has been elected engineer to the borough of Newcastle-on-Tyne.

THE East London Water Company have already completed the extension of the constant system of supply in a large part of their district, the whole of which is being brought, section by section, under constant supply.

MR. BERNARD DYER, F.C.S., member of the Society of Public Analysts, of 17, Great Tower Street, London, has been appointed analytical and consulting chemist to the Nottinghamshire Chamber of Agriculture.

MR. GEORGE SMITH, of Coalville, has received a letter from Mr. Sclater-Booth, in which he says 'that the session is now so far advanced that it is impossible to say whether the Canal Boats Bill will be passed this year.'

THE Duke of Northumberland has promised to contribute 1,000*l.* to the Home Hospitals Association, if the whole of the 20,000*l.* named in the prospectus is raised by January 1, 1879. About 4,000*l.* has been promised already, and further contributions may be sent to the honorary secretary, at the Mansion House; or to the bankers, Messrs. Barnetts, Hoares, Hanburys, and Lloyd, Lombard Street, E.C.

THE sanitary committee of Warrenpoint, near Newry, have requested Messrs. Mayne and Atkinson to report whether a water carriage or dry system of sewage disposal would be best suited to the requirements of the district.

THE Government inspector, in his report on the Board Schools of the borough of Hanley, strongly condemns several of the buildings as unfit for educational purposes, and in reference to some of them threatened the withdrawal of the Government grants.

THE Corporation of Leicester has been cast in damages at the assizes recently held in that town for damage caused to a ratepayer's property through the improper construction and insufficient cleansing of the public sewers.

AT the last fortnightly meeting of the rural sanitary authority of Malton, it was reported that the new system of water-supply and drainage for Hovingham has been completed to the satisfaction of the local committee. The total cost has been 1,635*l.*—35*l.* more than the estimate.

THE Governor of Bombay has written to the Municipality a strong letter, pointing out the urgent necessity that exists for the introduction of a drainage scheme; and with the same object in view, a remarkable letter has been published by Dr. Gray, showing the mischief which is caused by a too trusting reliance upon the effects of evanescent disinfectants.

MR. JOHN CARRICK, solicitor, Brampton, has been elected coroner for East Cumberland, in succession to his late father, who held the office for forty-two years. There was no opposition to the coroner-elect, who had acted as his father's deputy for seventeen years. Mr. P. H. Howard, of Corby Castle, in proposing his election, paid a high compliment to the merits of the late coroner.

A VERY satisfactory state of things as regards the vaccination of children exists in Stonehouse. At a recent meeting of the Board of Guardians a return read by the clerk (Mr. R. R. Rodd) showed that during the half-year ended December 31 last 245 children were born, and that of these 215 were successfully vaccinated, and the remainder satisfactorily accounted for.

A CASE was heard at Perth in which two manufacturers were charged with having allowed a quantity of chloride of lime to flow into the Almond, and a penalty of 5*l.* was inflicted upon each of the offenders, a mulct, however, quite inadequate to suppress an injury which does more than a hundred times that amount of mischief in a salmon or trout stream.

AT Romford the Board of Health have decided to invite tenders for lighting the street lamps either with petroleum or gas. This step has been taken after a prolonged dispute with the local gas company in reference to the price and quality of the gas supplied by them. Petroleum has been substituted for gas for lighting the street lamps at Barking, and the change is said to work satisfactorily and economically.

THE report of the Improved Industrial Dwellings Company for the past half-year shows that the company now possesses 23 estates in various parts of the metropolis, on which 2,225 dwellings have been erected, and are in occupation, and 688 are in course of erection. When these are completed, the number of persons residing in the company's dwellings will be about 14,000. The expenditure on capital account has reached 455,673*l.* The usual dividend of 5 per cent. is recommended for payment, after carrying 1,500*l.* to the reserve fund, which is thus raised to 26,500*l.*

THE deplorable deaths by drowning while bathing so frequently reported have induced the directors of the Floating Swimming Baths Company (limited) to make arrangements for giving instruction gratis in the art of swimming, in their Northumberland Avenue bath, daily, during the remainder of the present season, between the hours of 11 and 2, the usual instruction in swimming being suspended during those hours.

THE tenth half annual meeting of the Cork Improved Dwellings Company was held in that city on the 19th ult., when a dividend at the rate of 6 per cent. was declared upon the profits of the half year. The report showed that an addition of 104*l.* had also been made to the reserve fund. The chairman announced that the directors are in search of a site for the erection of additional houses, and that they propose to build some on the northern side of the city.

THE number of miles of streets in the metropolis which contain mains constantly charged and upon which hydrants for fire purposes could at once be fixed, in each district of the metropolis, is as follows:—Kent, 80 miles; New River, 175; East London, 85; Southwark and Vauxhall, 112½; West Middlesex, 70; Grand Junction, 41½; Lambeth, 70; Chelsea, 56, making a total length of 690 miles, and the water companies are ready to affix hydrants thereon when required by the authorities. The total number of hydrants erected is at present 4,279, of which 2,752 are for private purposes, 542 for street watering, 510 for public use, and 475 in Government establishments.

ADULTERATION OF WINES.

AS a rough and ready plan of detecting the presence of foreign colouring matter in red wines, a German contemporary recommends the use of quicklime, or carbonate of lime. Perhaps the simplest plan of all is to drop a little of the wine on a piece of chalk. Unsophisticated red wine will stain it brown or slatey-grey, bilberry juice blue, mallow either blue or green, and kermes juice and fuchsine have no effect on it at all.

IMPROVEMENTS IN UPPER THAMES STREET.

AT a meeting of the Court of Sewers on the 24th ult., upon a memorial from the rector, churchwardens, and parishioners of the parishes of Allhallows the Great and Less, requesting that the vote of 4,000*l.* for improvements in Upper Thames Street, by laying into the public way the site of the tower and vestibule of Allhallows, be increased, it was resolved, under certain contingencies, to add the sum of 500*l.* The salary of Dr. Sedgwick Saunders, medical officer of health, was increased from 500*l.* to 700*l.*

APPETISING!

THE reports recently issued by the inspectors of factories contain a letter from a certifying surgeon in Dublin, in which the writer says: 'Many rooms and workshops are, to the great danger of the public, in a most unhealthy condition, without medical inspection or certifying. I have met with cases of itch, syphilis, and other contagious diseases among those employed in confectionery and biscuit-making. In one of these works close on 200 hands are employed without any medical inspection or certifying, as I am informed. I have pressed on employers the necessity of letting me know before taking on any hands who may have recently had infectious diseases, with a view to prevent their introduction into factories.'

MONSTER RESIDENCES IN FLATS.

IT would appear that if a person purchased a large plot of ground even in a crowded district, and desired to build upon it a structure nearly resembling the tower of Babel for height, that provided he did not injuriously affect the light and air of his next neighbour, and provided that he satisfied the Metropolitan Board or other appointed authorities as to strength, no opposition would be offered to him. Taking the large block of buildings now being raised near St. James's Park, it appears that none of the neighbours have as yet complained of its overshadowing them. It appears also that such a building was never contemplated when the Building Act for the Metropolis was framed, and this being so, it is at least risky, we should think, to continue the erection of these tall barracks of houses until some limit is named as to height. It is a pity, therefore, that the bill introduced by Sir J. Hogg in 1874, was not carefully considered, as it was just about this date that the question as to the propriety and economy of erecting these copies of old Parisian and Scottish houses was frequently argued. The metropolis can boast some of the best (moderate sized) of these flat residences already, as for instance, the Grosvenor, the Belgrave, and the Cornwall mansions—but we think a line should be drawn with regard to the extent of these elevations skyward, were it only for what would result after a destructive fire; as it is, there is not sufficient room for them to fall down in, should the fireproofing systems adopted fail.

OUTBREAK OF SCARLET FEVER AT NEW BARNET FROM INFECTED MILK.

A VERY sudden and severe outbreak of scarlatina occurred at New Barnet between April 29 and May 4, no less than 128 out of 140 cases having happened in those few days. The first suggestion made was that the outbreak was caused by sewer exhalations, but it was soon found that several patients did not live near any sewer openings, whilst the incubative period being short, it was evident that the disease must have had a common origin. This was looked for in the milk-supply, when it was found that 58 cases of scarlet fever and 12 of sore throat occurred in 135 houses supplied by the same milkman, and only 9 cases in 286 houses supplied by three other milkmen. As inquiries were made at all the houses in the roads in which the cases occurred, this evidence was deemed by Dr. Saunders to be conclusive as to its origin. It does not, however, appear from the report that any inquiries were made at the dairy farm, but we have learned from another source that an untrapped drain opened indirectly into the dairy. We would also call attention to the paper on this subject just published in the SANITARY RECORD by Mr. Turner, in which this outbreak is noticed, and an abstract given of various endemics of scarlatina and typhoid, and showing how an investigation should be made into such cases in order to satisfactorily trace out the cause.

PAPER HABITATIONS.

FROM *The New York Mail* it appears that ever since 1857, a Wisconsin Company has been in the habit of manufacturing paper for building purposes, and that at the present moment they keep three mills constantly running, turning out about sixteen tons per day. The paper is a thick, hard pasteboard, wound in rolls of 25 lb. to 100 lb. each, and usually 52 in. wide. While in process of manufacture it is subject to a pressure of hundreds of tons, which compresses the fibres together in one solid body, thus thus making an absolutely air-tight sheet; and as paper is one of the best non-conductors known, it resists the action of both heat and cold, and so a building lined with it is made warm in winter and cool in summer. It does not shrink like lumber, and is not affected by frost, cold, heat, or dampness; and it is known that it will not burn as readily as wood, on account of its hardness and solidity, and by its use a house can be almost, if not absolutely tight.

This application of paper is not an absolute novelty, and houses largely built of *papier maché* material are to be seen we believe in London. There can be no objection raised to paper as a building material provided that it can be compressed to such an extent as to resist the soakage of moisture caused by breathing or cooking. And it is

very evident that this can be achieved, for the tyres of railway wheels are now manufactured of this vegetable matter. More than this, a patent has, we believe, just been taken out for the sheathing of ships' bottoms with paper as a protection against weeds, grasses, and barnacles, it having been found that these impediments to fast-sailing do not adhere to a cement of waterproof paper.

THE NEW MANCHESTER WATER-SUPPLY.

THIS most gigantic scheme of water-supply, which in every way transcends that of Glasgow, is at last decided upon, and after the necessary time for carrying out the first portion of the works, about 10,000,000 of gallons of water daily will flow from Thirlemere Lake to a reservoir near Bolton for the supply of Manchester, and possibly after a short interval, of Preston, Lancaster, Bolton, and other adjacent towns as well. About 50,000,000 of gallons per day, it is estimated, can be supplied from this source, and the purity of the water is also beyond all matter of doubt.

According to the design of Mr. Bateman, who is the engineer for the scheme, the water is to be carried from the lake under Dunmail Raise (one of the Westmoreland mountains) by a tunnel, and then passed above Grassmere, Rydal, and Ambleside, to the river Troutbeck, which stream is crossed by an inverted cast-iron syphon pipe. The tunnel is then continued through an open country to the south-west of Windermere railway station. The conduit will mostly run along the hills, and entering Lancashire, it will cross the River Lune about five miles from Lancaster. It is thence continued southward, in the direction of Garstay, crossing the River Ribble about five miles to the east of Preston. It then proceeds in a south-easterly direction, until it reaches the neighbourhood of Rivington, passes close under the Rivington reservoirs of the Liverpool Corporation Waterworks, and finally terminates in a large service reservoir near Bolton, some twelve miles from Manchester. The total length of the conduit will be about 100 miles, and the cost of bringing the first 10,000,000 of gallons will be about 2,000,000*l.* sterling. When each additional syphon is laid to cross the rivers on the route, another 10,000,000 gallons will then be conveyed, but the cost of this enhancement of supply will be proportionately less than that of the first. The bringing in of the first instalment will occupy, it is believed, about seven years.

BUILDING ON GRAVEYARDS.

MR. EDLIN, the assistant-judge at the Middlesex Sessions, has just decided that an order cannot be made under the Artisans' Dwellings Act, 1868 (Torrens' Act), requiring the owner to pull down houses erected on a graveyard. The evidence as to the unsuitability of the site was very strong, as it was known that 600 or 700 bodies had been buried under the site of the houses, that the spot was not drained, 'that the ground was perfectly honeycombed with bodies, and in a state of corruption; that the whole ground was made up of bones, rubbish, wood, and the remains of bodies.' Upon this statement, backed up by the medical officer of health and the surveyor, the Islington vestry made an order on Mr. Bouffler, the owner of the houses, to pull them down, against which he appealed, when the order was quashed, with costs. Mr. Bouffler states that the houses and floors are made entirely of concrete, and are very strong, so that no smell can get into them, and that no bodies have been buried there since 1853. There was no evidence given as to any structural defects of the buildings, whilst the whole tenor of the Act shows that it was intended to apply only to premises which are so structurally defective as to be incapable of improvement or alteration. The failure of the Islington vestry in this case, renders the necessity for an alteration in the law all the more necessary, for, as we have often pointed out, there is nothing to prevent the erection of buildings on such foundations as these or to prohibit their occupation, unless it can be shown that they come under the Nuisances Removal Acts, and are absolutely injurious to health, that is to say that the effluvia have caused certain diseases amongst the inhabitants. That the effluvia must be more or less prejudicial to health by producing a low state of vitality and predisposing to the reception of zymotic diseases there can be no doubt; but this does not appear to be sufficient, so that these horribly disgusting sites may still be used, until some such amendment as that contained in the Public Health (Metropolis) Bill shall have become law. It is, therefore, to be hoped that Mr. Sclater-Booth will, as promised, introduce next Session a bill to amend and consolidate the various Sanitary Acts at present in force in the metropolis.

NEW SEWERAGE SCHEMES.

SCARCELY a week elapses without our receiving local newspapers containing the examinations which have taken place before local government inspectors relative to new schemes for sewering towns or districts, and one cannot help coming to the conclusion that a great deal of most valuable time is wasted and a great expense incurred by the ratepayers, owing to the crudeness or incompleteness of the plans and estimates. We have repeatedly noticed these in our columns, but the bulk of these inquiries have been too lengthy to justify us in giving them in any detail. The Redditch sewerage scheme inquiry, and that at Hounslow has now been followed by one at Hove, and a long examination into that proposed system of drainage has lately been gone into at the Town Hall. There was the usual contradictory evidence, and the commissioners and the inspector alike must have been ill satisfied with the contradictory character of the evidence brought forward.

A still more tedious inquiry has just been concluded as to the Birmingham United Drainage Scheme. In this case the matter was complicated by the necessity of entering upon the question of representation of the various districts. There are nine districts, exclusive of Birmingham, included in the proposed area, and it was resolved that one representative should be chosen from each of these, except Aston urban sanitary authority, which should be represented by two members. Birmingham, it was agreed, should have twelve representatives, so that the new drainage board would consist altogether of twenty-two members, with a majority of two for the borough of Birmingham. It was further decided that one of the representatives for Birmingham should be the mayor, and one of the two chosen from Aston the chairman of the board, so as to provide for the clause in the Act of Parliament which states that there must be *ex officio* members.

Special Reports.

THE ARTISANS', LABOURERS', AND GENERAL DWELLINGS COMPANY.

AN adjourned extraordinary general meeting of the Artisans', Labourers', and General Dwellings Company (Limited), was held last week at the Westminster Palace Hotel, to receive the report of the Committee of Investigation appointed by the shareholders at the extraordinary general meeting on June 2 last. The report, after tracing the various steps taken by the committee and the appointment of new directors to act *pro tem*, proceeds to point out the 'loose manner in which the cheques of the company have been drawn, having been signed and the amounts left blank.' Under these circumstances, it was not very extraordinary to find that in many cases materials had been purchased at an extravagant cost. A very great quantity of goods required had been bought of one man, which might have been far more cheaply purchased from the wholesale dealers themselves. The prices actually charged to the company had been most exorbitant, samples of

which were appended as follows: Ventilators, price paid, 1*s.* 2*d.*, market price, 6*d.* to 8*d.*; nails (cwt.), price paid, 1*l.* 8*s.*, market price, 18*s.*; kitchen range, price paid, 1*l.* 12*s.*, market price, 25*s.*; ochre (cwt.), price paid, 12*s.*, market price, 6*s.*; oak varnish (gallon), price paid, 16*s.* 6*d.*, market price, 10*s.*; copal, ditto, price paid, 25*s.*, market price, 17*s.*; turpentine, price paid, 3*s.* 1*d.*, market price, 1*s.* 10*d.*; bronze green (lb.), price paid, 1*s.* 6*d.*, market price, 6*d.*; iron fencing (foot), price paid, 3*s.* 6*d.*, market price, 2*s.*; iron window guard, price paid, 4*s.* 6*d.*, market price, 2*s.* 9*d.*; air bricks (each), price paid, 8*d.*; market price, 2½*d.* The committee believed that this excess of prices represented nearly 20,000*l.* out of an expenditure under these branches of 50,000*l.* The total sum paid as commission on the issue of shares was over 21,000*l.*, and the law costs showed a waste of money. One item of such costs was 280*l.* for the company's costs incurred for a trivial action against a trade newspaper for libel, in which a verdict was entered for the defendants, and the opposition to licenses for public-houses outside the company's estate had swallowed up a large sum of money, as also had a prolonged litigation with the Wandsworth local board with regard to drainage, and which the committee honestly believed could have been arranged amicably. The remuneration pay for the collection of rents had also been excessive.' The committee consider that the purchase of the Cann-hall estate was a useless and improvident act, as the development of the valuable Queen's Park Estate held by the company was quite sufficient to occupy its resources for some time to come, and it was also abundantly clear that dividends had been mainly paid out of money subscribed for capital, while at the same time that capital was being invited and obtained from the public on the grounds that those dividends had been earned, and that if the irregularities and waste which had already absorbed so much of the company's capital had been allowed to continue any longer unchecked, the financial ruin of the company would inevitably have followed. The accountant's report was to the effect that the books had been indifferently kept, that erroneous principles of valuation had been adopted, and that sufficient pains had not been taken to ascertain the outstanding liabilities before striking the balance which the directors treated as profit. The accountants pointed out in reference to the bank loan of 55,000*l.*, that at the very time the company had on deposit 20,000*l.* at 1 per cent. they had borrowed 35,000 at 5 per cent. The accountants' report concludes with an opinion that, until the Cann Hall Estate and other unproductive lands are either sold or utilised, only a very small dividend can be expected upon the capital subscribed. The architect reports that the points referred to him were exceedingly unsatisfactory; that the cost of material had been unduly high, and obtained through channels where competition seemed to have been excluded; workmanship and material were of common description, entailing, in his opinion, heavy cost for repair in future years on the estates. He had come to the conclusion that the Cann Hall Estate would be a profitable source of revenue if small well-built houses were constructed upon it. Messrs. Cheston and Sons writes to us from 1, Great Winchester Street Buildings, E.C.: 'Your report of this case in the *Times* of Thursday states that we acted for Mr. Saffery in some of the negotiations. You will, perhaps, allow us to state what we had to do with the matter. In December, 1875, we perused, on Mr. Saffery's behalf, the contract for the purchase of the Cann Hall Estate, and subsequently examined the title. In March, 1876, on Mr. Saffery's instructions, we prepared the contract for the sale of that estate to the Artisans' Dwellings Company, and subsequently delivered the abstract of title, and settled on Mr. Saffery's behalf the conveyance of the estate to that company. Beyond this we had nothing to do with any negotiation either for the purchase or sale of the estate, or with any negotiation of any kind relating either to the estate or the purchase-money.'

The chair was occupied by the Hon. Evelyn Ashley, M.P., who, in opening the proceedings, said they had met that day in very peculiar circumstances, the gentlemen being there as members of the Committee of Investigation, and also, by force of circumstances, as members of the Board. After thanking the gentlemen who had taken part in the investigation, he said it appeared to him that the 'irregularities' which had occurred were largely attributable to the want of energy on the part of the shareholders, who in future, he hoped, would not be so apathetic in looking after their affairs. The committee had now been in office about three weeks. They had found an enormous amount of work before them, and, as they came into office confronted with great financial difficulties, they were not able to give any accurate details regarding the company's prospects. They had found that there were deposits amounting to 53,000*l.*, and they were all payable at ten days' or a month's notice, while the only available money they found to be about 3,000*l.* or 4,000*l.* They had obtained a large advance of money at about 2 per cent. less than they had been paying to the bank, and ultimately they would save some 2,000*l.* a year in interest. With regard to the deposits, the interest paid on them was 5 per cent., and the fact of having so many deposits was a serious risk. They had, therefore, met every claim on them in this respect, and they had refused to accept any fresh deposits. Referring to the estates in hand, he said they were well fitted for the purposes for which they were bought, but the present board were not now in a financial position to carry on the works on some of the sites, and they therefore intended to complete the buildings which were in an advanced stage of progress, in order that the rents might be soon secured. They desired now to obtain a return, however small, to the shareholders for their money, and leave the question of extension for some future time. Alluding to the prosecution now going on, he said the Board felt that it was their duty, but a very painful duty, to initiate these proceedings. After the prosecution was begun, the whole of the facts were placed before the Home Secretary, who came to the conclusion that the expense of the prosecution should be borne by the Treasury, thus relieving the shareholders of the expense. The prosecution was for the benefit of the community generally. There were other legal proceedings going forward, and there was the question of the liability of persons connected with the late management who may have taken moneys to which they were not entitled. Mr. Worcester then moved a resolution adopting the report, and tendering the best thanks of the shareholders to the committee of investigation. He cordially acknowledged the services of those gentlemen, and considered that the shareholders were very fortunate in having men of such high position to take up their affairs. Mr. Hoskins, one of the members of the old board, thought the thanks of the shareholders were due to the gentlemen who had instituted the investigation. He trusted that Mr. Swindlehurst and Dr. Baxter Langley would succeed in clearing themselves from the painful charge which had been brought against them. After alluding to the part which he himself had taken in the management, he expressed his sympathy with the position of his late friends, and trusted the new board would place the company's affairs on a safe foundation. After a few observations from the chairman as to his position as a director, a shareholder thought the committee had not been sufficiently long in making their report. He trusted that Mr. Evelyn Ashley would be appointed to the chairmanship of the company. Mr. Samuel Morley, M.P., severely criticised the proceedings which had led to the prosecution which was now going forward, and said he was very glad indeed that it had been taken up by the Government. He would give all the assistance in his power to the board. Dr. Baxter Langley trusted the meeting would listen to a few words from him as an almost broken-hearted man. He had himself never sought any connection whatever with the company, nor would he have joined the board had it not been for the request of others. The

amount he had received as director's fees was entirely invested in the company, and from time to time he had increased his holding. He asked whether it was likely that a man who was nearly sixty years of age, and who had lived so long with an honoured and respected name, would commit himself in a way which some persons thought he had. After a reference to the duties and services he had performed, he admitted that the company may have outgrown the capacity of some of those who were on the management, but he believed that was the worst charge which could be brought against them. He thought the board had adopted a very cruel course, and the committee had deprived him of every farthing which he required for the purposes of his defence. The resolution was adopted, and after a discussion a sum of 300*l.* was voted to Mr. Pearce for his services. The meeting was then adjourned for the appointment of two directors, and the names of Mr. T. Brassey, M.P., and Mr. J. G. Talbot, M.P., were proposed. The meeting separated after passing a vote of thanks to the chairman.

MR. GLADSTONE ON THE POLLUTION OF AIR AND WATER.

AT a pic-nic lately held in the grounds of Hawarden Castle by the Bolton Liberal Association, Mr. Gladstone made a speech, in the course of which he said: 'I hope some of you will live to see the time when there will not be such a complete contrast between manufacturing towns and the country as there is now. There must, however, always be a great contrast in many respects between places where vast numbers of people are gathered together and places where there are few. As a rule, there are three disagreeable things in large towns—one is noxious smells, one is the want of pure water, and the third is the enormous abundance of smoke. It appears to me that God Almighty never ordained any of these three things; I do not think it was His intention or permanent law that these things should subsist wherever people are gathered together in large numbers, and I cannot help hoping that some of you will live to see a great improvement made in some of these respects. Do not look upon this as hopeless, but it requires that people should think of it a great deal, for there is always somebody or other who thinks he is interested in maintaining the present state of things. Some manufacturers complain bitterly if they are not allowed to throw the whole of their filth and refuse into the water from which the people have to take their drinking-supply. Some time ago I met a large manufacturer of paper, and asked how he was getting on. The answer was, "Oh, right well." You know the paper manufacturers generally said they would be ruined if the paper duty were repealed. However, this gentleman was not ruined, but, on the contrary, said he was getting on famously. I said, "You mean that you do more business," and he replied, "Yes, we do more business and we get more profit on it." "How does that come about?" I asked, and the answer was, "Well, formerly we used to throw into the river a large quantity of what we thought was mere filth and refuse, worthless stuff which came from the manufacture, we did not know how to make use of it; but by some legal or statutory authority we were prevented from putting any more refuse into the stream. We then had to consider what we were to do with this refuse, and we caused it to be examined by a chemist, who enabled us to turn it to account;" and the result was that this paper manufacturer made out of the refuse which before then ran to waste and defiled the stream a profit of 3,000*l.* a year. Nobody likes to have the secrets of his business disclosed, and therefore I must not tell you where this factory is. But you will see that in this case necessity was the mother of invention, and what was formerly mere waste was turned to account, while the running water was left clear, as God intended it to be. Then there is London, with its four millions of people. I have lived in the West-end of London for six-and-forty or five-and-forty years—I really cannot remember the exact number; but although there is a greater number of people there, and the town has spread in all directions, yet when you open a window now the air is purer and fresher, and fewer "blacks" come in, than 40 years ago. The reason is that Acts of Parliament have been passed to prevent people from wantonly and wilfully making smoke, and compelling them to consume it. This is now done to a great extent—not quite so much as it ought to be, but still a great improvement has been effected. God made this world to be pleasant to dwell in. I don't mean to say He made it to be without trial or affliction, but he made our natural and physical condition to be pleasant. The air, the sun, the skies, the trees, the grass, and the streams—these are all pleasant things; but we go about spoiling, defacing, and deforming them. We cannot, it is true, make the town as pleasant as God has made the country, but most of you can do something to prevent the pleasant things which have been vouchsafed to us from being deformed and defaced by the hand of man in the future. Take that as the moral of this little speech.'

EXHIBITION OF SANITARY APPLIANCES.

A LARGE and interesting exhibition of sanitary appliances was opened in the grounds of Owens College on Tuesday, under the auspices of the Manchester and Salford Sanitary Association, who have seized the present opportunity for holding the exhibition in consequence of the annual meetings of the British Medical Association being arranged to take place at Owens College during the week. A temporary wooden building for the purposes of the exhibition has been erected in the rear of the College, the entrance being in Coupland Street; but one of the departments—namely, that of sanitary literature—has been placed in a room of the adjoining medical school, where also the medical and surgical museum in connection with the British Medical Association will be displayed. The exhibition is to remain open a fortnight. Mr. Eassie, C.E., F.L.S., and Dr. Lory Marsh (London) will attend the exhibition as a committee from the Sanitary Institute of Great Britain, to whom they are instructed to report the result of their observations. The exhibitors number 106, and they belong to such widely-separated places as London, Grantham, Glasgow, Burton-on-Trent, Woolwich, Brighton, Lyme Regis, Lytham, Gloucester, Carlisle, Brighouse (Yorks), Coalbrookdale (Shropshire), Preston, Liverpool, Chesterfield, Plymouth, Leeds, Buckinghamshire, Dudley, Wrexham, Winchester, Nottingham, Southampton, Birmingham, Retford, Halifax, Manchester, etc. There are seven sections in the exhibition. Drainage and the disposal of refuse is illustrated by 115 appliances, or collections of appliances; sanitary architecture and building by 10; water-supply, ventilation, disinfection, heating, and lighting by 145; methods of consuming smoke and purifying rivers by 19; food, clothing, and personal conveniences by 42; the disposal of the dead by 7; and sanitary literature by 10. Thus the entries reach a total of 348. The objects which will no doubt excite the greatest amount of general interest are two models of crematory apparatus, which have been lent by the Crematory Society of Milan. The first is the invention of Dr. Ludovic Brunetti, professor of pathological anatomy at the University of Padua; and the second of Professor Clericetti, Milan. Both models represent apparatus by means of which 'several successful cremations' have been performed. The judges are Dr. W. H. Corfield, professor of hygiene and public health, University College, London; Mr. J. Corbett, architect; Dr. F. de Chaumont, assistant professor of hygiene, Army Medical School, Netley Hospital; Dr. J. Hardie, Manchester Royal Infirmary; Mr. T. Harrison, surgeon; Dr. D. J. Leech, Manchester Royal Infirmary; Mr. A. G. M'Beath, civil engineer; Mr. John Newton, civil engineer; Mr. Osborne Reynolds, professor of civil engineering, Owens College; Dr. Arthur Ransome, lecturer on hygiene and public health, Owens College; Dr. J. Maule Sutton, medical officer of health, Oldham; Mr. F. Vacher, medical officer of health, Birkenhead; Dr. H. H. Ver-

non, medical officer of health, Southport; and Mr. T. Worthington, president of the Manchester Society of Architects.

Detailed reports of the more important inventions and novelties will appear in early issues.

Parliamentary Proceedings.

HOUSE OF COMMONS.

(*Friday, August* 3.)

THE LIERNUR SYSTEM OF SEWERAGE.

IN reply to Mr. E. Jenkins, Mr. Sclater-Booth said: About two years ago I caused a general inquiry to be made into existing systems of sewage disposal, in respect of which money had been borrowed with sanction of the Government. The inquiry was undertaken by my hon. friend the member for Norfolk, then Parliamentary Secretary, and Mr. Rawlinson, Chief Engineering Inspector of the Local Government Board. In the course of their proceedings incidental to the inquiry, they examined with, I think, sufficient minuteness, into the Liernur system, and the result of their examination will be found in the report which has been presented to both Houses of Parliament. The letters specified in the question of the hon. member were neither addressed to nor written by the Local Government Board or myself, and I cannot therefore undertake to lay them on the table of the House.

Law Reports.

BREACH OF THE WORKSHOPS ACT.

T. WICKHAM, of 73, Mile End Road, appeared to two summonses taken out under the Workshops Regulation Act, for having employed two persons, one Alice Hickling, a young girl, and another Amelia Constable, a woman, in his workshop, in dress-making, after the hour of nine at night, on July 12. An inspector under the Factory Act attended to prosecute, but the defendant pleaded guilty. The people were found employed at half-past eleven o'clock at night, but the defendant said his manager was responsible. Mr. Hosack inflicted a fine of 40*s*., and 4*s*. costs.

BY-LAWS AS TO COMMONS.

J. GIONTA and L. Gionta, Italian ice-sellers, were summoned at the instance of the Vestry of Camberwell for assaulting R. Vance, keeper of Peckham Rye Common. This case involved the right of itinerant vendors of various commodities to make use in their calling of Peckham Rye Common. By-laws had been made by the vestry to preserve order, and to allot portions of the common to persons selling. The defendants each had a barrow, and one was beyond the line allowed; the keeper went to remove the barrow, when he was assaulted. The defence was that the complainant had used more force than was necessary, and had endeavoured to turn over the barrow. Witnesses were called in support of that contention. On the other hand, it was alleged that the keeper was authorised to remove parties infringing the by-laws and their barrows. Mr. Ellison considered it was a very important question as to the rights of the public, and that the vestry was justified in bringing the case before the Court. The by-laws gave power for removal, but no penalty was provided in the same for an infringement. It was not a severe assault, and therefore he should not inflict so severe a penalty as he should do for a future offence. He fined the defendants 10*s*., with costs.

BREACH OF THE FACTORIES' ACT.

MADAME MERCIER, dressmaker, of 45, Park Street, Grosvenor Square, attended in answer to six summonses taken out against her by the inspector of factories, for unlawfully employing six workpeople after four o'clock in the afternoon on a Saturday. Mr. Henderson stated that on visiting the defendant's premises at a quarter to five on the afternoon of July 7 he found six or eight females at work. The defendant said she did not know she was doing wrong. Mr. Henderson said that could not have been the case, as she had previously been served with a printed notice. Mr. Newton ordered her to pay 3*s*. and costs in each case.

REFUSE FROM LEAD MINES.

V. C. HALL has had before him the case of the Marquis of Londonderry *v.* Rhoswydol Lead Mining Company, a motion for an injunction to restrain the defendants, on a stream called the Crewi, in Montgomeryshire, a tributary of the river Dovey, from fouling the Dovey by permitting the refuse to pass from the mining works into the Crewi, so as to be carried, as the evidence showed, into the Dovey, destroying the fish and damaging the low-lying land upon which the refuse was deposited by the river floods. As many as thirty-seven salmon had on one day been seen dead below the junction of the Crewi with the Dovey, and it was alleged that these salmon had been killed by the refuse from the defendants' works. The flow of this refuse could be prevented by an improvement in the company's catch pits, which they were willing to effect. The defendants admitted that damage had been caused by the working of the mine, and the Vice-Chancellor granted an injunction.

AN ARTIFICIAL MANURE CASE.

THE Queen's Bench Division has had before it the case of Reg. *v.* Bradburn. This was an indictment found at the Stafford Assizes, and he applied to remove the indictment into the Queen's Bench Division, with the view of having the case postponed. The assizes commenced on the 10th inst., and a bill was found against the defendants on July 11. They were charged by the Wednesfield Local Board with carrying on certain chemical works at Wednesfield, thereby causing a nuisance, and carrying it on in such a way as to be injurious to health. The defendants in their affidavit said that this was an important issue to them, and that they produced many tons of artificial manure, sulphuric acid and copperas, and they employed a large number of persons. The ground on which they based their application was, that this was a matter for a special jury, and that it was desirable that the jury should have a view of the premises. The Court granted the application for a special jury, fixing the sureties for the defendants in 100*l*. each.

ADULTERATED BEER.

R. T. WATSON, landlord of the Red Lion beerhouse, Peckham, was summoned for selling adulterated beer. S. Fisher, one of the sanitary officers of the vestry, went to defendant's house and asked to be served with three pints of beer. The defendant's wife supplied him, and he then told her he intended to have the beer analysed. Some portion of it was examined by Dr. Bernays, of St. Thomas's Hospital, who certified that it contained over ten grains of salt to the pint, and would induce thirst. Defendant said he went out to his employment, and his wife did the cellar work. It was the first house in the beer trade they had had, and the party of whom he took the business told him a little salt would keep the beer right, especially in hot weather. Mr. De Rutzen considered the offence a very serious one. He ordered defendant to pay a penalty of 10*l*. and 12*s*. 6*d*. costs. Later in the afternoon Mr. De Rutzen reduced the penalty to 5*l*. and costs, but added that it was because the vestry did not press for the heavier fine.

LOCOMOTIVE ENGINE SMOKE.

V. C. BACON has had before him the case of Smith *v.* Midland Railway Company. The plaintiff, the owner of a mansion called Netherheys, at Colne, Lancashire, situate near the junction station of the Midland and the Lancashire and Yorkshire Railway Companies, complains of the nuisance occasioned by the defendants, the two above companies, in lighting their engine fires close to his house, and thus pouring forth volumes of suffocating smoke, to the injury of the health of himself and his family, and the damage of his property. A great portion of the nuisance complained of was said to arise from the practice adopted by the men who clean the engines and light the fires of throwing into the fire their rags of cotton waste saturated with oil. The Vice-Chancellor said he had always thought that the law of the country provided protection against nuisance, but the argument had been that the Acts of Parliament by which these railway companies were constituted had made lawful that which would otherwise be unlawful; and that these defendants had a right to commit the nuisance complained of. An authority in the House of Lords which had been cited went to this—that although the making and working of a railway might occasion an inconvenience amounting to nuisance, no one has a right to complain of that. But this complaint was not with reference to the making or the working of the railway; it was as to the doing of an act which the defendants admitted could not be justified unless authorised by statute. The simple question, therefore, was whether the Acts of Parliament did justify it. His lordship commented on the evidence, and came to the conclusion that it was proved that whereas twenty-eight years ago the Midland Company alone employed a shed which was sufficient to prevent all appreciable injury from the limited number of engines then used, now, since the junction with the Lancashire and Yorkshire, a much larger number of engines was collected, which were cleaned and lighted in the open air, occasioning an intolerable smoke and deposit of soot and sticky matter. There was no complaint that the engines were not properly constructed, and it should not be forgotten that under the 114th Section of the Railway Clauses Act the Legislature had declared that every locomotive engine was to consume its own smoke. There might be a difficulty about recovering the penalty; but the illegality of non-smoke-consuming engines was established. On the construction of the statutes, therefore, his lordship was satisfied that the acts complained of, being established in evidence, were not justified; and further, that the defendants had means at their disposal of abating the nuisance. The plaintiff was entitled to an injunction to restrain the defendants from causing or permitting smoke or vapour to issue from their shed at the station in question so as to occasion a nuisance to the plaintiff. The defendants must pay the costs.

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

PATENT SANITATION.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Mr. Buchan should come to the point about the 'novelty' of his 'patent ventilating trap,' as he calls it, and not make rash assertions, threaten to have people 'pulled up,' and remind them that 'nobody provokes him with impunity.' He claims 'the constructing of ventilating syphon traps with a vertical drop, and an air ventilating channel, respectively below and above the entrance of the inlet branch to the well of the trap,' as his 'invention.' I have already shown, and I again repeat, that the 'ventilating syphon trap' described in his patent was in use in connection with brick drains before thirty years ago, and has been frequently used by myself and others ever since. I have also often seen a 6-inch pipe with a square junction cemented into the socket of a 6-inch syphon trap with a vertical inlet. The vertical drop and air channel thus produced forms the 'patent ventilating trap' which Mr. Buchan claims as his 'invention.'

Mr. Buchan says, at page 66, that because the outlet 'B' in my sketch at page 14 has 'a quick contraction,' I am not quite so well 'posted up' in ventilating traps as I imagine. A book of mine, published in 1851, relating to sewerage and house-drainage, contains a number of syphon traps with a straight slope up to the outlet. These are precisely the same as the syphon traps in Mr. Buchan's patent of 1875. It is, therefore, Mr. Buchan who is not 'posted up' in these matters. JOHN PHILLIPS.

Putney, Surrey, July 31, 1877.

NUISANCES PREJUDICIAL TO HEALTH.

(*To the Editor of the* SANITARY RECORD.)

SIR,—In the SANITARY RECORD for May 18 of the current year (p. 323), I reported a case of nuisance which had been brought before the magistrates in Bath. I related their decision, and the grounds upon which it was based. I also requested the opinions of other medical officers of health upon the question of '*Open* privies unsupplied with water situated at some little distance from dwelling-houses.' Query, are they, as a rule, supposed to create conditions prejudicial to health? I have not seen any replies to my questions, or any observations made on the case, in subsequent numbers of the RECORD.

As I anticipated, further steps must be taken, as the magistrates' order was ineffective; but I should like to be fortified with the opinion of some of my brethren in office or your own on the subject—first, as regards the existence or non-existence of a nuisance; secondly, as regards the weight to be attributed to the evidence given by my professional opponents either on chemical or practical grounds.

Yours faithfully,

Bath, July 28, 1877. A. B. BRABAZON.
Medical Officer of Health.

Sanitary Inventions.

THE ABYSSINIAN TUBE WELL.

NOTHING can be more interesting than a study of the various systems whereby a collection of water is brought to the surface for the use of man and beast, or for purely agricultural or manufacturing purposes. The primitive methods still in use in various parts of the old world have much that is especially interesting, and there is much to be learnt in a study of even common wells and force pumps; but perhaps the greatest interest would culminate in an examination of what are called artesian wells, which are formed by boring with hollow rods into the earth until a subterranean body of water be reached, the sources of which are more elevated than the site upon which the perforation is begun, in which case the water will ascend above the surface in its natural endeavour to reach its own level. Sometimes, however, the desirable consummation in which water overtops the tube is not reached, and the water has to be fathomed with pumps in the ordinary way.

When rain falls or snow is melted on a range of hills opposite, and filtrates through porous strata, finding its way through fissures to an impervious bed below the surface of the valley, it courses along a curved channel which it has made for itself, and if any part of this valley be bored down to this water-course the water will rise and become, in fact, a natural fountain. It does not matter whether the valley be miles in extent or not, but the force of the ascending water will be greater at the lowest level, and diminish as the level of the source is approached. The same law holds good as to the force with which

springs issue on the sides of a hill. The term Artesian, it may be added, is derived from a province of France, Artois, where water is mostly bored for in this fashion, and numbers of wells of this description are now to be met with in all civilised countries. They are frequently very deep; that at Dieppe is about 1,020 feet, but that depth has been exceeded even in London on a late memorable occasion, when it was sought to reach the lower greensand and its fluid stores. The quantity yielded per minute may even exceed that at Perpignan, where 500 gallons were counted.

Not only on a large scale can these artesian wells be constructed, but on the simplest. On one occasion we saw where Messrs. Le Grand and Sutcliffe bored a well of this description only some 90 feet deep, and were rewarded with a flow of water which rose 9 feet above the top of the tube and proved sufficient to supply a mansion in Lincolnshire with the best potable water. Herein consists the chief value of the system from a sanitary point of view, for it is only in a few places where there are no fractures in areas of stratified rock, or fissures where heavy rains or the water of atmospheric vapours do not course along, seeking an opportunity of escape again. And it ought to be the chief concern of sanitary engineers to seek for this purified water, and trust less or not at all, to mere surface sources of supply which are so liable to every kind of contamination. And we venture to say that when these wells are more generally sunk, and the facilities they offer more widely known, they will be made use of even as a source of motive power. In France the waters of artesian wells are made use of in moving corn mills and water-wheels, of silk mills, and even in communicating motion to huge olivers for the manufacture of nails. For the matter of that also, the water so derived being purer than any other kind, the flax used in the finer kinds of lace and linen cannot be properly prepared without it, while in order to preserve the fish alive in the Montmorency ponds, near Paris, during severe winters and very hot summers, it was found imperative to supply them with the equably temperatured and clear waters of an artesian well.

On the present occasion, however, we have more to say concerning what is called the Abyssinian Tube Well—which is a kind of artesian well, in which the perforating rod is driven down to the subterranean source of water-supply just as a pile is driven. The name is derived from the country where, during the late war there, the system won golden opinions for the ease with which water was pumped. And it must be understood that it does not very much matter at what depth the water is bored for, for even should the tubes be driven down 100 feet, if only the water rises to within 25 feet of the surface, simply an ordinary pump is required. For the rest, tube and pumps of 1¼ inch sectional area will raise a volume of water from 150 to 900 gallons per hour, depending upon the freedom of the water-bearing strata—a 2-inch tube 300 to 1,500 gallons, a 3-inch one from 450 to 2,000 gallons per hour of working. Where there is a very free yield, even 100,000 gallons can be raised with ease, as may be easily understood after an inspection of any of the breweries, soda-waterworks, ironworks, or railway stations, where a large supply is imperative. And, as it frequently happens that there is a paucity of water in the strata below, but still a sufficiency for one tube, a series of these can be driven—say, from 10 to 30 feet apart or even more, and these tubes can be all connected to the one pump. We had occasion to notice, only the other day at East Barnet, a supply managed in this way, and led to the house-cistern, and it was working admirably. Without such a modification, a series of pumps would have been necessary, as the underground water but very slowly filtered through the sand to the perforations at the foot of the tube. Messrs. Le Grand and Sutcliffe, who drove the wells in question, have a very ingenious system of ridding the trial tubes of collecting sand. We have also seen them in the gardens of cottages, in cow-sheds, and the like, and all giving satisfaction. There is no manner of doubt in our minds whatever that, for ensuring purity of supply, for rapidity of exploitation, for freedom from the annoyance caused by freezing, and, above all, for economy, this 'tube-well' system is everywhere to be recommended. And, more than this, not only can normally pure, and cool, and refreshing water be obtained by its means for drinking and cooking purposes, but, if a force-pump be affixed, there is at once a fire-engine ready to hand.

We recommend our readers, who wish to know more about the advantages, and who desire to learn the prices of these ingenious tubes and pumps, to consult the pamphlets and price-lists of Messrs. Le Grand and Sutcliff, of Bunhill Row, London.

THE PULSOMETER.

EVERYONE is more or less acquainted with the various kinds of the common arrangements of pumps, whereby water is lifted from deep or shallow wells, and if he is not able exactly to remember the whole series of these, a look at the catalogue of the larger manufacturers will at once bring them back to his recollection, accompanied with all their specific functions. It is not unlikely also, more especially if he is a student of these matters, or has had some practical experience of pumping machinery, that the extensive series of what are termed centrifugal pumps will pass in mental review before him, the original pattern of Le Demour, in 1732, the Massachusetts pattern, invented in 1818, which approached nearer to the true centrifugal fan pump; the Blake pump of 1831, which was the earliest example of the centrifugal disc pump; the Andrews improved pumps of 1839 and 1846; the Appold rotary pump of 1848; the Bessemer centrifugal pump, which is perhaps the first patented invention for impelling fluids by the centrifugal force generated in a revolving disc, and so on, down to the completer pump known as Gwynne's, which discharges a quantity of water, under favourable conditions, equal to 90 per cent. of the driving power, and which, unlike the bulk of the other rotary pumps, is compact, speedy in action, and is able to admit of foreign matters which have been found to destroy the action of the working parts. He may even remember the Donkins disc pump, exhibited in 1851, with its beautiful adaptation of the water-meter. And if his reading has kept pace with the inventions of the day, he will have some knowledge of the working of the latest addition to pumping machinery, known by the name of the pulsometer.

The pulsometer, like all the foregoing inventions, is intended for service in mills, breweries, steam-boats, and in docks, etc., and indeed everywhere where water is required to be lifted for water-supply, or for fire-engine uses, also for drainage and irrigation purposes, at varying depths. But it will do more than this, it will pump tar and sewage, and no mud or solid substances found in an ordinary way in fluid matters, will stay its efficiency. It will also act from the surface of the ground, or work equally well if lowered into a deep shaft. And so steady is the action of this wonderful pump, that if the steam is once applied and kept up, it will, from the entire absence of friction, work without cessation for days together, in this matter resembling very much the work done by self-acting pile-drivers.

The chief value of this pump is its entire independence of all pistons and valves likely to get out of order, and of all leather suckers or cylinders. It pumps water from a depth, but it will also throw water to a height, after passing the pulsometer. The power exerted is not expended therefore in the mere raising of the water; there are rather two forces at work, inasmuch as the water is raised by pneumatic pressure, and is ejected by the force of the entering steam. Given for instance a requisite pressure of steam, about 1 lb. for every 2 feet, the water can be raised up to say 80 feet. The work done by this machine in actual practice far exceeds the first expectations of the inventors and manufacturers, Messrs. Hodgkin, Neuhans, and Co., of Queen Victoria Street, London, and as an example of what has been done in the draining of a quarry at Glasgow, we find it stated that it was satisfac-

torily emptied in a short time, the lift being 24 feet, the steam pipe 90 feet long, and the boiler pressure 22 lbs. It behaved throughout in excellent fashion, though a considerable quantity of sand was present, and we read elsewhere that at Northampton the gas company's engineer made use of one of these pulsometers in sinking a well through sand and gravel, with similar good results.

It is difficult to give any very clear description of the construction of the pulsometer without a more or less eloborate plan, and it will repay our readers to go and examine it in action for themselves, and have it explained to them by the manufacturers. But it may here be shortly stated that it consists of two large chambers side by side, at the base of each of which are two openings, upon the seating of which rests a ball, and above these chambers is a smaller one, where there is another but smaller ball. The object of this is to close one of the orifices, the other being open, and when steam is admitted from an ordinary boiler at the top of the upper chambers—the chambers first of all being filled with water—they are alternately filled and emptied with great rapidity, and with a uniform discharge. The apparatus has simply to be bolted to a tube leading down to the water, mud, sewage, tar, or whatever has to be raised, and no stuffing, packing, or oiling is required to keep the pulsometer efficient. It is even doubtful whether the wearing of the upper ball has any retarding effect upon its working.

From this very short description—and this not being an engineering journal we could hardly be more explicit—it will be at once observed that here is a unique and most ingenious invention, able to fulfil anything that is required, and the ultimate value of which it is impossible to foresee. Even in sanitary matters it will be found the most efficient thing devised, owing to the ease with which sewage of a more or less solid character can be raised to any reasonable height. We trust that the attention of all city and borough engineers, surveyors, and local boards generally will be at once directed to its many adaptabilities, and above all to its economy. We cannot help characterising it as the chief invention of the day, and which not only deserves the silver medal which it obtained at Liverpool during the present year, but the heartiest commendations wherever, throughout the world, there is engineering or sanitary work to be performed. We will recur to the advantages offered by the pulsometer, as we are able to cull from time to time correct reports of the varied work it has performed under difficult conditions and in novel situations.

ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS.

THE following is a list of officers elected for 1877–8 :—

President—Fredk. Ashmead, M. Inst. C.E., Bristol.

Vice-President—F. G. Deacon, M. Inst. C.E., Liverpool; A. W. Morant, Assoc. Inst. C.E., Leeds; E. Pritchard, Assoc. Inst. C.E., Warwick.

Council—Lewis Angell, Past-President, M. Inst. C.E., West Ham; James Lemon, Past-President, M. Inst. C.E., Southampton; J. G. Lynde, Past-President, M. Inst. C.E., Manchester; E. B. Ellice Clark, Assoc. Inst. C.E., Hove; P. B. Coghlan, C.E., Sheffield; C. Dunscombe, M.A., C.E., Derby; A. M. Fowler, M. Inst. C.E., Salford; J. E. Greatorex, C.E., Portsmouth; S. Harpur, Assoc. Inst. C.E., Merthyr Tydvil; P. C. Lockwood, Assoc. Inst. C.E., Brighton; E. J. Purnell, C.E., Coventry; W. S. Till, C.E., Birmingham; E. L. Stephens, C.E., Leicester; J. Fox Sharp, Assoc. Inst. C.E., Hull; T. C. Thorburn, C.E., Birkenhead.

District Secretaries—E. B. Ellice Clark, Hove; E. Pritchard, Warwick; R. Vawser, Warrington; B. C. Cross, Dewsbury.

General Hon. Secretary—Charles Jones, Assoc. Inst. C.E., Ealing.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

ALLUM, Mr. Thomas, has been appointed Inspector of Nuisances for the Loughborough Rural Sanitary District, vice Cooper, resigned.

BRABAZON, Anthony Beaufort, M.D. King's Coll. Aberd., L.R.C.S. Irel., L.S.A. Lond., has been reappointed Medical Officer of Health for the Bath Urban Sanitary District for one year.

BRETT, Mr. Frederick, has been appointed Inspector of Nuisances for the Stowmarket Urban Sanitary District, vice Rust, resigned.

MILLER, Mr. Thomas, has been appointed Surveyor and Inspector of Nuisances to the Corporation and Urban Sanitary Authority of Hythe, Kent.

PARKS, Charles Holman, M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the St. Columb Major Rural Sanitary District, Cornwall.

PARRY, Mr. Robert, has been appointed Inspector of Nuisances for the Great Crosby Urban Sanitary District, vice Thoms, appointed Engineer and Surveyor to the Corporation and Urban Sanitary Authority of Wolverhampton.

READE, Mr. Thomas M., has been appointed Surveyor to the Great Crosby Local Board and Urban Sanitary Authority, Lancashire, vice Thoms.

ROLSTON, Peter William, M.R.C.S. Eng., L.S.A. London, has been appointed Medical Officer of Health for the No. 4 Sub-District of the St. German's Rural Sanitary District, vice Littleton, deceased.

VACANCIES.

BRIDPORT, CORPORATION OF, AND URBAN SANITARY AUTHORITY. Surveyor, Inspector of Nuisances, and Collector: 120*l.* per ann. Application, 13th instant, to F. W. Gundry, Town Clerk.

BURTON-ON-TRENT RURAL SANITARY DISTRICT. Two Medical Officers of Health: 50*l.* per ann. each for three years. Inspector of Nuisances: 200*l.* per ann. for three years. Applications, 25th instant, to William Coxon, Clerk to the Authority.

GRAVESEND, CORPORATION OF, AND URBAN SANITARY AUTHORITY. Assistant Surveyor and Inspector of Nuisances: 150*l.* per ann. Application, 13th instant, to G. E. Sharland, Town Clerk.

HANDSWORTH LOCAL BOARD AND URBAN SANITARY AUTHORITY, Staffordshire. Surveyor: 300*l.* per ann. Application, 13th instant, to Henry Ward, Clerk, Church Street, West Bromwich.

NORTHAMPTON URBAN SANITARY DISTRICT. Medical Officer of Health: appointment 13th instant. Application to William Shoosmith, Town Clerk.

OVER-DARWEN LOCAL BOARD AND URBAN SANITARY AUTHORITY, Lancashire. Gas Manager. Application, 11th instant, to Charles Costeker, Clerk.

PENKRIDGE RURAL SANITARY DISTRICT, Staffordshire. Medical Officer of Health: 100*l.* per ann.

RADNORSHIRE. Public Analyst: 21*s.* per analysis and travelling expenses when attending to give evidence. Application to the Clerk of the Peace, Presteign.

SALFORD, CORPORATION OF, AND URBAN SANITARY AUTHORITY. Surveyor and Engineer.

STOCKTON, CORPORATION OF, AND URBAN SANITARY AUTHORITY. Surveyor.

TAMWORTH RURAL SANITARY DISTRICT, Staffordshire. Medical Officer of Health: 120*l.* per ann. Application, 11th instant, to John Shaw, Clerk to the Authority.

TUNBRIDGE RURAL SANITARY DISTRICT. Inspector of Nuisances: 120*l.* per ann. for three years. Application, 15th instant, to Frank W. Stone, Clerk to the Authority, Tunbridge Wells.

UPPER SEDGLEY URBAN SANITARY DISTRICT, Staffordshire. Medical Officer of Health: 70*l.* per ann. Inspector of Nuisances: 70*l.* per ann. Applications, 13th instant, to Joseph Smith, Clerk to the Authority.

WIGAN, BOROUGH OF, AND URBAN SANITARY DISTRICT. Inspector of Nuisances and Hackney Carriages: 100*l.* per ann., and an allowance for clothing. Application, 14th instant, to Maskell W. Peace, Town Clerk.

WIMBLEDON LOCAL BOARD AND URBAN SANITARY AUTHORITY. Surveyor: 250*l.* per ann.

WINSLOW RURAL SANITARY DISTRICT, Buckinghamshire. Medical Officer of Health: 60*l.* per ann. Application, 21st instant, to Thomas P. Willis, Assistant-Clerk to the Authority.

NOTICE.

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Original Papers.

SANITARY STATE OF CAPE TOWN.

THE forthcoming International Exhibition of South Africa will soon be drawing the attention of correspondents and news-readers to the capital city of the British colony, Cape Town. It is to be hoped, likewise, that the attention of some travelling sanitarians and hygeists will be attracted to the city at the same time, but for a different purpose. Late reports state that the statistics of mortality have now attained the exceedingly high figure of 68 per 1,000 per annum for March, 1877—quite as bad as the ancient mortality of the British army in Bengal, of 69 per 1,000 per annum, previous to the introduction of modern sanitary improvements by the medical department after the mutiny of 1857-58.

Cape Town has become in the last ten years much isolated from the general progress of the civilised world, since the opening of the Suez Canal in 1867, and so has become withdrawn from the influences of cosmopolitan inspection and criticism by travellers, tourists, and correspondents. This defect has not even yet been attempted to be rectified by the laying of telegraphic connection with contiguous countries east and west. It is only a few years (1867-68) since that a serious endemic of typhoid fever raged in Cape Town, and slew a large number of its inhabitants, from 1,000 to 1,100 in addition to the ordinary mortality of about 800 per annum during its prevalence of seven months, July-December, 1867-January, 1868, thus raising the ordinary rate of 27 deaths per 1,000 per annum to an amount varying from 60 to 63 per 1,000 per annum. The causes of this unexceptional mortality have never been difficult to discover, and have been reported on year after year by the medical officers of the garrison to the Director-General of the department in London, and but little or no action has ever been taken on them by the civil managers of the town.

Blue books of the medical branch of the army for the last twenty years have generally contained some critical remarks on the low hygienic condition of Cape Town, and the inaction and inability of its inhabitants in not ameliorating its condition. This may be partly explained by a large proportion of its mercantile classes being of a migratory and non-naturalised class, and therefore not disposed to consider such reforms as of serious personal interest. There would be little difficulty in the present day in its governing body raising a respectable loan of 100,000*l.* in London at 5-6 per cent. interest, as many other colonial cities have done, and expending it in various ways for the sanitary improvement of the place and the reduction of its excessive mortality.

The population of Cape Town has been of very slow growth, and sometimes even stationary; the numbers in 1808 were 18,000, in 1831-32 were about 20,000 in the census then taken, and 10,000 of these were Europeans; in 1840 about 20,000; about 1856 it is stated at 25,000, about 1865 at 28,500, and since 1870 at 29,000, and by the census of 1875 at 32,907. Now all this is considerably below the rate of increase of most colonial cities in Australia, New Zealand, and Canada, and even of our own seaports in England, hampered as their growth is by vested interests, price of land, and administrative restrictions. The population is of a very mixed nature—British, Dutch, Malay, Negroes, and Hottentots—respecting the proportionate numbers of which there are no recent statistics, except for 1865, which estimates the Europeans at 15,118. Each have their own ways of living, good, bad, and indifferent, and some by no means suitable to the health or comforts of the other nationalities living contiguous to them, and these dependent on want of personal ablution, the washing of soiled clothes, the cleansing of their lodgings, the primitive style of cooking, and the disposal of excreta and organic refuse of their dwellings.

The rates of mortality for Cape Town have been variously estimated, and the data themselves have been subject to doubt, as the returns have not been accurately kept, nor for many years have been at all available for reference. The generally received information had placed the number of deaths in ordinary times at 800 per annum (Ebden), at the rate of 27 per 1,000 per annum for a population of 30,000 on the average, but the mortality for 1876 is estimated as high as 33 per 1,000 per annum (Landsberg, January 1877), and during part of that time, December 1876, it was as high as 44 per 1,000. All these estimations tend to place the health of the city in much the same category, as to rates and causes, as Liverpool, Glasgow, and Dublin, in this country, with their rates above 30 per 1,000 per annum, and causes, a mixed shipping population and seaport.

The mortality has been generally larger among the children of all races, and the coloured people generally, as the former are more susceptible to insanitary conditions of climate and life, and the latter because they are more numerous and poorer, and their houses and huts more squalid and dirty.

The position of the city cannot be complained of, as it lies on a sloping plain of two miles wide, or about four square miles in extent, descending from the foot of Table Mountain Range, 3,582 feet high, to the shores of Table Bay, on its northern aspect, and so drainage should be fully provided for. The town is open to the equatorial winds from NW. to NE. and E., but is sheltered on the W., SW., S., and SE. aspects from the cooling polar winds by the range of Table Mountain, Devil's Peak, and Lion Mountain, forming three sides of a basin, of about 3 to 4 miles diameter, and this exclusion is a great disadvantage during the hot summer months of December, January and February. The main streets of the city are of good design, wide, straight, and at right angles to each other, and the houses were originally of the Dutch [illegible] structure, but the lower class of them have now become deteriorated by time, 100 to 200 years old, and occupancy, and also saturated by exhalations from squalid tenants and pythogenic diseases. The scavenging has always been a source of complaint for years, dirt and exuviæ of all descriptions being often left in some of the back streets for days, and the conservancy of the excreta being still effected by the old-fashioned system of house tubs and buckets. The removal of their contents is done by a nightly service of stercus carts and waggons, which proceed to the beaches of Table Bay and discharge their contents into the sea on its margin, and not into its middle as ought to be done by means of barges towed from two to three miles out.

The water-supply of the town has now become of a very meagre and inferior description for many

reasons, and is now totally inadequate to the various wants of a metropolis and seaport, with its manufactures and labour markets, docks, railways, steamers and ships, and all these pulling on the diminutive reservoirs of thirty years ago. There is no river to get water from for the washing of streets, houses, carriages, stations, warehouses, ships, laundries, etc., and so the drinking water-supply is laid under contribution for purely hygienic and industrial purposes. In consequence of the extension of the habitations of the lower class of the labouring population towards the precincts or behind the city, the surface ground of that district towards the base of the mountain is becoming defiled by their washings and excreta. The pluvial drainage from this part, therefore, is liable to be soiled and impregnated with organic exuviæ, which a meagre rainfall of only twenty-four inches per annum scarcely suffices to thoroughly cleanse.

The upper part of this area has continued to be one source of the supply of water for filling the town reservoirs, also those situated near the Kloof Roads, and in which, however, floating adventitious matters now get but little spare time to settle down or become oxidised. Another part of the supply is derived from springs at the base of the mountain, above Platte Klip, emerging from the junction of the horizontal sandstone and the underlying beds of granite, and these are probably fed by the mists and rains falling on the plateau on the summit. Another insanitary condition as already stated is defilement of the beaches in front of the city, and the sea itself of Table Bay by the deposition of the excreta on to them, and into it, which matters are washed back again by the next flowing tide, and redeposited. This has rendered the site of the military hospital on the coast near Papendorp almost untenable, and it is only saved from pythogenic pollution by the general prevalence of SE. winds blowing the effluvia from the shore to seawards in the bay in front.

The well-to-do portion of the mercantile classes have taken up their residences now in the suburbs outside the basin of Table Bay, where they get more exposure to healthy winds, and cooler climates. Some frequent the villages of Mowbray, Rondebosch, Claremont, and Wynberg to the east and south, to which there is access by railway, and others prefer Sea and Green Points round to the west, and accessible by tramway.

Two sanitary defects, however, still continue to follow them even there, the defective drainage and sewerage, and the scanty fresh water supply. Those districts have still no fresh water, rivers, or streams, with permanent supplies, but only gullies or nullahs whose intermittent waters get dried up in summer, as was experienced at the Wynberg Sanitarium, and impaired its efficiency for invalid purposes. The scarcity of natural springs round the flanks of Table Mountain ranges, is a serious permanent defect, owing to the horizontality of the sandstone strata, and schemes for new fresh water supplies are thus left mainly to depend on the rainfall being impounded in reservoirs in the hill side ravines. It should be considered necessary also that the area of the existing rainfall drainage should be fenced in all round at the base of the mountain behind the city, so as to exclude the wandering natives using them for camping, squatting, woodcutting, or washing purposes.

The system of depositing the sewage matters of the city into the sea on the beaches, has become more objectionable to health and amenity since the construction of the new breakwater and docks, in Table Bay, from 1860 to 1870, when they were opened for use. This jetty has contributed to place an obstruction to the ingress of the tidal currents, which circulate round the bight of the bay from W. to E. as it is built straight out into the sea from SW. to NE. from the Mouille Point shores. In any future schemes of drainage, and sewerage, the outlets of the conduits would have to be placed, in consideration of this obstruction, further along the shores towards Blauberg, on the east side of Table Bay. Another suitable outlet, it is suggested, would be into Camps Bay, on the south-west side of the city behind the Lion's Head, to which these conduits might be led by a small tunnel 3–4 miles long under the Kloof Neck, or Pass ; but this, however, is not of a very feasible engineering character.

There is no reason why Cape Town should not be perfectly salubrious, with a rate of mortality of 20 per 1,000 per annum, as it has a fine dry climate, with a temperature of annual average of 68° and mean range of 38°, and plenty of sunshine and wind, and has a dry rocky soil, good building materials, and no wet or clay marshy lands round its margins. For the attainment of this object one has but to recommend previous suggestions, a good system of sewerage and scavenging, and the establishment of new reservoirs for additional supplies of fresh water. As the former might only be able to be achieved by the aid of the latter, these then become of vital necessity for the continued good health of the city. It would be requisite to trace out fresh and better rainfall areas on the east and south sides of Table Mountain, where there is a larger rainfall of 39-44 inches per annum than at Cape Town, get them well planted and fenced in, build new catchment reservoirs, about Wynberg, then to carry conduits thence round the flanks of the Devil's Peak, to supply other tanks placed above the level of the city for distribution of the water for public and private use. There remains, however, still the uncertainty of obtaining a sufficient amount of water to serve the purposes of both flushing the sewers when constructed, and for domestic and industrial uses, and if this should turn out to be the case, then removal of excreta will have to be carried out by other means. In contradistinction to the present system, it may be suggested that desiccation might be tried, the mass of sewage might be removed to drying tanks outside the town on the Flats, and there dried by the heat of the sun and the dryness of the air, and converted into guano, and then sold to the agriculturist for manure.

In this country, in many places, water may be got from deep wells and borings to supplement public supplies, but there seems but little probability of getting such an addition at Cape Town in consequence of the geological formations under it being unfavourable. There are no continuous beds of tertiary strata to act as sponges to absorb the rains, and the sandstone strata of the Table Mountain Ranges lie horizontal, so that they give no inclination to guide gravitation of water, and they lie unconformably on the edges of the older silurian slates and shales, except where sheets of granite lie interposed. Further, there are no water-bearing rocks in Cape Town corresponding to the chalk, clays, and greensands of the south-eastern, or the limestones and red sandstones of the western districts of England, to give origin to springs.

Sewage farms have been proposed to be laid out and planted on the Cape flats five to six miles distant to the east, for the reception of the organic exuviæ of Cape Town, and its conversion into agricultural produce. These, however, under present conditions of scarcity of water could not be worked on the irrigation principle, as at Aldershot and Cheltenham, because there is no surplus water in the mains to carry the sewage from the city to the Cape Flats. These are a dry sterile common, lying between Table Bay and False Bay, about fifteen miles' interval, composed of sandy ridges and hillocks and iron-stone gravel or clay in the hollows, and sprinkled with heath and a stunted vegetation, and devoid of surface-water or springs.

Portions of these flats, however, could be better utilised for the formation of new cemeteries for Cape Town somewhere conveniently situated along the lines of railways, instead of the old ones within the basin of Table Bay, which have now become a sanitary nuisance. The old ones are situated round the flanks of the Lion's Mount to the west of the city, facing Green and Mouille Points, and they are now full, and their drainage will gravitate down to the city near the New Docks and Breakwater, Convict Station, and General Hospital. The oldest have been in use for one or two centuries for all classes and races of the inhabitants, and have received the victims of the various epidemics that have previously ravaged the city, so that the time has nearly arrived for their closure, and the removal of interments to a more suitable locality.

It may be wondered at that the mortality is not greater than it is, considering the numerous materials existing to deteriorate the health of the city. This anomaly can only be explained by the beneficial action of the ozoniferous Polar winds and breezes from the Southern Ocean. These prevail from E. to S. inclusive for eight or nine months out of the twelve of the year, and for 812 times out of 1,822 times of observation during the year (Maclear). The most violent of these, during the summer months, blow clouds of dust and sand into the sea of Table Bay, and are commonly called 'Cape Doctors,' from their known salutary influence. These south-easters have a curious clarifying effect upon the sea of the bay over which they blow from the land, and it may be seen to be rendered perfectly transparent to great depths, notwithstanding the dust. It may, therefore, be reasonably conjectured that they have a like beneficial action on the atmosphere of Cape Town, and rinse out of it all the previously accumulated noisome exhalations and miasmata.

Finally I might add that a full supply of fresh water for the city would perhaps leave sufficient margin for the establishment and maintenance of public baths and washhouses by the municipality, which is a great and urgent want in a metropolitan city and seaport, especially in a hot and dry climate like that of the Cape. I am doubtful even if any means have yet been taken to utilise the sea-water of Table Bay, with the view of affording ablutionary means for the public, either of the European or native communities. These would certainly be a powerful auxiliary to health and cleanliness, and contribute a considerable quotum to precautionary measures against the origin and spread of diseases in the labouring and industrial population of Cape Town.

THE IMPORTANCE OF A KNOWLEDGE OF THE LAWS OF HEALTH.*

BY THOS. BOND, F.R.C.S., M.B., AND B.S. LONDON.

Assistant-Surgeon to Westminster Hospital, and Lecturer on Medical Jurisprudence.

1. ON an average, one-half of the number of out-patients treated by a hospital surgeon suffer from diseases due primarily to a want of knowledge of the laws of health and cleanliness. The ignorance of hygienic laws, which affects so disastrously the health of the rich as well as the poor, exists chiefly in regard to dress, ablution, and ventilation. This statement may, at first, appear startling, but an enumeration of the diseases that can be constantly traced to the above causes will show upon how sound a basis the statement rests. The following are examples: Varicose ulcers from dress; skin diseases from want of cleanliness; chest diseases and fevers from defective ventilation. The vast number of ulcerated legs treated in the out-patient departments of hospitals, in workhouse infirmaries, and in private practice, arise from varicose veins. Now, a varicose ulcer is caused by a distended condition of the veins of the leg, which have to sustain the pressure of the blood caused by gravitation. In varicose veins the valves which help to support the column of blood are, to a great extent, destroyed, through the veins having been distended by mechanical obstruction to the free return of the blood from the extremities, thereby distending the lower veins and separating the edges of the valves. Thus, the weight of an uninterrupted column has to be borne by the veins. This, of course, causes further distension, giving rise to congestion of the capillaries of the skin, and causing swelling, eczema, and ultimately ulceration. This is the varicose ulcer so common in the labouring classes. It is always difficult to heal, and often impossible, except by prolonged rest in bed. Hence it is the dread of the surgeon, and the cause of misery to thousands. Varicose ulcers are seldom admitted into general hospitals, so that hundreds of poor families are driven to the workhouse, and such cases form a majority in the workhouse infirmary. The most frequent and flagrant cause of obstruction is the ordinary elastic garter. Children should never wear them at all, as the stockings can be perfectly well kept up by attachment of elastic straps to the waistband. If garters are worn, it is important to know how to apply them with the least risk of harm. At the bend of the knee the superficial veins of the leg unite, and go deeply into the under part of the thigh beneath the ham-string tendons. Thus a ligature below the knee obstructs all the superficial veins, but if the constriction is above, the ham-string tendons keep the pressure off the veins which return the blood from the legs; unfortunately most people, in ignorance of the above facts, apply the garter below the knee. Again, in nine out of ten labouring men, we find a piece of cord or a buckled strap tightly applied below the knee, for what reason I could never learn. Elastic bands are the most injurious. They follow the movements of the muscles, and never relax their pressure on the veins. Non-elastic bands during muscular exertion become con-

* Read before the Annual Educational Conference, June 23, 1876.

siderably relaxed at intervals, and allow a freer circulation of the blood.

2. The habit of tight lacing again predisposes to varicose veins, in consequence of the abdominal viscera being pushed downwards into the pelvis, causing undue pressure on the veins of the lower extremities when they enter the pelvis. Physicians also have reported numerous cases of heart and lung disease caused by this pernicious habit.

3. The use of dress is often misunderstood; most persons evidently study and practice it with regard to appearance, or only to keep out wet and cold. The hygienic use of clothes, however, is not so much to keep cold out as to keep heat in. The mistake is often made of taking great care to put on extra wraps and coats when preparing for out-door exercise. This is not at all necessary in robust persons. Sufficient heat to prevent all risk of chill is generated in the body by exercise. The care should be taken to retain sufficient clothing after exercise, and when at rest, to prevent the heat passing out of the body. Indeed, persons very often catch chills from throwing off extra clothing after exercise, or from sitting about in garments, the material of which is not adapted to prevent the radiation of heat from the body. Linen and cotton underclothing, when moistened by perspiration, parts with heat very rapidly, whereas flannel and silk, being non-conductors, prevent the rapid loss of heat.

4. The most recent offence against the laws of health is the habit of wearing false hair. The perspiration of the scalp is prevented by the thick covering from evaporating, thereby causing a sodden and weakened condition of the skin, which predisposes to baldness and other diseases of the scalp. Again, it produces headache and confusion of the intellectual faculties. We all know what a relief it is, during hard mental work, simply to raise one's hair by running the fingers through it.

5. Ablution is another subject of paramount importance to health. Mr. Urquhart, the introducer of the Turkish bath into this country, is one of the benefactors of the age, and it is to be hoped some day there will be a bath in every town and village in England. Doctors are very much to be blamed for allowing themselves to be prejudiced against it. The usual opinion given by medical men to their patients is that it is debilitating, and only to be borne by the robust. The reverse is really the case; it is stimulating and strengthening, it is a preventive as well as curative in disease. The effect of the Turkish bath on the skin is to cause an active condition of its functions of elimination, by removing the hardened epithelial scales, by removing the fat from the pores, and by causing the sweat glands to maintain the activity of their functions, giving a general stimulus to the vital power of the skin. Again, it keeps the body in a state of perfect cleanliness, which is so essential to robust health; but these are not its only virtues, it promotes purity of mind and morals. The man who is accustomed to be physically clean, shrinks instinctively from all contact with uncleanliness.

6. There are, however, certain precautions to be observed in the use of baths. Persons who are apoplectic, or suffering from fatty degeneration of heart, should not venture to disturb the circulation by the excitement of baths. The first effect of Turkish baths is to stimulate the circulation, the second to cause active congestion of the skin, the third to produce profuse perspiration, the fourth to keep down the temperature of the body by rapid evaporation. On leaving the Turkish bath the body should be douched with cold water; the capillaries are thus emptied of their blood by contraction, but immediately after the stimulation causes them to resume a state of activity, and produces vigorous circulation through the skin.

7. In taking a cold bath in the morning the same conditions should be present. The surface of the body should be warm and moist; therefore, the bath should be taken immediately on rising from the bed, and before the surface of the body has had time to cool or the capillaries to contract. The shock of the cold water should cause them suddenly to contract, then quick reaction will take place in the same way as after a Turkish bath. Unless this reaction occurs after the bath, there is great danger of getting a chill, at any rate the full benefit of the bath is not obtained. Persons with weak circulation who cannot take an ordinary morning bath, often derive great benefit from the Turkish bath. It opens the pores and improves the circulation of the skin, so that the shock of cold water can afterwards be borne. The same persons can generally bear a cold bath if they get for a few minutes into a warm bath first, and then immediately plunge into cold water. By these means an active reaction is brought about. Warm baths should, in my opinion, never be taken on rising except under the above conditions, but warm baths at night are often desirable. They should be taken just before going to bed, when they have the effect of relaxing the muscular system and of promoting sleep by soothing the activity of the brain by the withdrawal of blood from it. I do not think warm baths at night are weakening, as the depression of vital energy which may occur is recovered during sleep. In river and sea bathing, persons should be careful not to remain in the water too long, nor should they exert themselves sufficiently to cause exhaustion, as the power of reaction is much impaired thereby; neither should persons get into cold water when cooling. The old-fashioned idea that persons should wait to cool before plunging into the water is a fallacy. There is no danger in plunging into the coldest water in a state of profuse perspiration if the heart and arteries are in a healthy state. Of course it would be unwise to do so immediately after a full meal, as the action of the heart might be impeded by the distended stomach.

8. Many persons complain of always getting up tired in the morning. This is very often due to defective ventilation of the bedroom, or from using an undue amount of bed-clothes and bedding. Feather beds are too soft and yielding, and partially envelope the sleeper, thus producing profuse perspirations. The habit of lying too much under blankets is also very pernicious, by reason of the carbonic acid exhaled by the sleeper being respired. Again, it is a common error to suppose, that by simply opening a window a little at the top a room can be ventilated. People forget that for proper ventilation there must be an inlet and outlet for the air. In bed-rooms there is often neither, and if there is a fire-place it is generally closed up. Again it is a mistake to suppose that foul air goes to the top of a room. Certainly the heated air goes to the top, but the chief impurity, the carbonic acid, falls to the bottom. There is nothing so efficacious in removing the lower strata of air as the ordinary open fire-place, especially if there is a fire burning. The

usual defect in ventilation is the want of a proper inlet for the air. If the window be open the cold air being heavier pours down into the room, causing draughts; if the door be open, or ajar, the same thing occurs. The perfection of ventilation may be obtained in any room with a fire-place by simply providing proper inlets for the air, and nothing answers so well for the purpose as the upright tubes invented by Mr. Tobin. By this means the heavier external atmosphere ascends vertically through the tubes like the jet of a fountain, displacing the warmer and lighter atmosphere of the room, which finds its exit up the chimney. The tubes should communicate with the outer air on a level with the floor, and should be carried vertically upwards in the room for about four or five feet. A constant supply of fresh air is thus ensured without the slightest liability to draught, as the current goes directly upwards till it strikes the ceiling. It is then diffused downwards, mixed with the heated air of the ceiling. The same principle can be carried out in any room with a sash window, by cutting out two or three holes an inch wide and three inches long in the woodwork of the upper sash where it joins the lower one. The columns of air ascend directly upwards, just inside the window, and mix with the heated air in the upper part of the room. If this system were universally carried out, we should hear less of rheumatism and chills caught by sitting in draughts.

9. Persons should cultivate the faculty of detecting sewer gas in houses. Typhoid fever is often caused by the escape of this gas into the house through defect of the traps and drains. However bad the drains may be outside the house, there is little to fear, provided the gas can escape externally. The following two very simple precautions would naturally diminish the cases of typhoid fever: first, every main drain should have a ventilating pipe carried from it, directly outside the house to the top of the highest chimney; secondly, the soil pipe inside the house should be carried up through the roof, and be open at the top.

THE
SANITARY RECORD.
FRIDAY, AUGUST 17, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

THE CANAL BOATS' BILL.

As there seems a certainty that this bill will pass this session, and as important alterations have been made in it since we last explained its provisions, which was before it went to the select committee, it seems desirable that we should make our readers acquainted with the present features of the bill. Beyond stating that contrary to what might have been expected the alterations have been on the side of increased stringency, we do not propose to set out the changes in full, but to go all through the bill again, analysing it so as to give our readers an idea of its present form.

After the expiration of twelve months from the commencement of the Act, a canal boat must not be used as a dwelling unless registered under the Act. The registration authorities are such sanitary authorities in England and Wales having districts abutting on the canal as the Local Government Board may prescribe. If any canal boat is used as a dwelling in contravention of the Act, the master, and also the owner, if he is in fault, will each be liable to a fine of 1*l.* or less, for each occasion on which the boat is so used.

The Local Government Board is to make regulations for (1) the registration of canal boats, including fees in connection therewith; (2) the lettering, marking, and numbering of such boats; (3) fixing the number, age, and sex of the persons who may dwell in a canal boat, having regard to the cubic space, ventilation, provision for the separation of the sexes, and general healthiness and convenience of accommodation of the boat; (4) promoting cleanliness in boats; and (5) preventing the spread of infectious disease by boats.

On registering a boat the registration authority is to give to the owner two certificates identifying the owner and the boat, and stating amongst other things the number, age, and sex of the persons allowed to dwell in the boat. Every registered boat is to be marked as such, by having on it the word 'Registered,' and the name of the place of registry, and the registered number. A boat not duly marked, lettered, and numbered, or with its mark, letter, or number altered, defaced, or obliterated, is to be deemed an unregistered boat.

Where any sanitary authority is informed that a person dwelling in a canal boat is suffering from an infectious disorder, the authority is to take such steps as may, by medical certificate, appear requisite for preventing the said disorder from spreading.

The authority may remove the patient, and may detain the boat, and is, moreover, invested with all the powers respecting infectious diseases conferred by the 'Public Health Act, 1875,' but the detention of the boat is not to be for a longer time than is necessary for cleansing and disinfecting it.

Certain powers of inspection are conferred on nominees of a registration or sanitary authority, but it would seem that such nominees must be armed with a special warrant, for the person acting as inspector may be required to produce either a 'copy of his authorisation' or 'some other sufficient evidence of his being authorised' to inspect. The master of the boat must, if required, exhibit his certificate, and permit it to be examined and copied. A penalty is prescribed for obstructing an inspector, of 2*l.* or less.

With respect to the education of children dwelling on board canal boats there are special provisions (and those originally in the bill have been added to by the select committee); but, as we said on a former occasion, these provisions are foreign to our present purpose of explaining the Public Health features of the Act.

The expenses incurred by a local authority are to be defrayed out of its ordinary fund; and in rural sanitary districts are to be deemed 'general expenses.' All fees are to go to the fund or rate of the registration authority. An order of the Local Government Board making, revoking, or varying any regulation under the Act is not to come into force until it has lain for forty days before both houses of parliament during the session of parliament. The Local Government Board is to take steps for enabling all persons interested in regulations to obtain copies thereof on payment of a fee.

Provision is made for the illegal detention of a certificate by a master of a boat. Penalty for detaining a certificate 2*l.* or less. A person injured by the detention of a certificate may receive any part of the fine.

Offences under the Act are to be prosecuted and fines recovered under the 'Summary Jurisdiction Acts.' The Act may be administered by justices having jurisdiction either in the place where the boat is registered to belong, or where the offence is committed, or where the alleged offender for the time being is, as the case may be. 'Canal' includes any river, inland navigation, lake, or water within the body of a county, whether it is or is not within the ebb or flow of the tide. 'Canal boat' means any vessel, however propelled, which is used for the conveyance of goods along a canal as defined in the Act, and which is not a ship registered under the 'Merchant Shipping Acts.' The Act is to come into operation on January 1, 1878, and is not to extend to Scotland or to Ireland.

The general effect of the alterations made in committee is to add to the stringency of the measure, and likewise to add to the powers and responsibilities of the Local Government Board, already, it is to be feared, much overtaxed, judging by the complaints which one hears on all sides.

THE WATER-SUPPLY AT SEASIDE WATERING-PLACES.

AT this time of the year, when all who can are hastening away to the seaside in search of renewed health and strength, no apology will, we imagine, be needed from us for recurring again and more fully to the question of the water-supply at the various towns on the coast which are now and for the next two or three months will be crowded with overworked men of business and their families.

The SANITARY RECORD has ever been among the foremost in urging the absolute necessity of a pure water-supply. Of course sanitary matters of all kinds come under our notice, but we have always considered water as of the first importance. Watering-places round the coast are especially exposed to danger from bad water, as the inhabitants there seem to think that, because the sea washes against the cliffs or banks which form the boundary of their town, they have nothing to do but to run the sewage into the sea, and it will certainly be carried away, and then with equal recklessness they dig wells close to the shore because they find that they obtain water more readily there, owing to the infiltration of the sea; or, as in one case which has come to our knowledge, they run an adit from the bottom of the well under a cemetery because the ground is more porous there, and therefore they get a better supply of water. Cases are not unknown in which the governing board of a town, be it town council or whatever other name it works under, has sunk a so-called well, and, without making any inquiry as to the character of the water, have doled it out to the inhabitants who, finding for themselves that it was quite unfit for drinking, have been compelled to resort to the purchase of a purer supply for domestic use. We have also heard of places where wells and cesspools have been sunk into the same chalk or sandstone stratum side by side, and within two yards of each other, and, absolutely incredible as it may appear, one case has come to our knowledge where a single excavation has been made to serve the double purpose of cesspool and well, and the family residing in the house had for upwards of six months been drinking their own excrement.

It will probably be remembered that last year we published analyses of the water supplied to some of the more frequented watering places near London, and although that publication produced a good deal of discussion and even ill-feeling on the part of some of the corporations concerned, yet so much good was done that the authorities of the town whose water was then stigmatised as the worst, immediately sank a new well, and this fact seems to us quite sufficient to justify us in the remarks we felt it our duty to make. From this circumstance and others with which we became acquainted while making inquiries connected with those analyses we have thought it very desirable that a much more extensive and exhaustive investigation should be made into the character of the water-supply of seaside watering-places, including not only the analysis of the water itself, but other points which are of but little less importance, namely, the nature of the supply, whether constant or otherwise, and the source from which it is derived, so as to enable some opinion to be formed as to its probable uniformity.

Mr. Wigner has, at our request, undertaken to conduct this investigation, and to write a series of papers on the subject. The first of these papers will

appear in our next number, and will comprise the water-supply of the towns on the Norfolk, Suffolk, and Essex coasts.

Notes of the Week.

THE Bulwell local board and urban sanitary authority, Notts, have increased the salary of Mr. Robert G. Buckby, the medical officer of health, from 30*l.* to 50*l.* per annum.

THE Wakefield guardians and rural sanitary authority have been invested with urban powers over the district of Stanley-cum-Wrenthorpe.

THE Bootle Town Council have unanimously increased the salary of Mr. George Biddle, the surveyor, from 160*l.* to 200*l.* per annum.

AT the Fourth Centenary of the Festival of the University of Tubingen, the degree of Honorary Doctor was conferred upon Professor Tyndall (London).

THE correspondent of the *Daily News* reports that the Russian army begins to suffer in health, chiefly from preventable causes, especially the neglect of sanitary regulations.

HER Majesty has conferred upon Captain Tyler, late Chief Inspector of Railways, the honour of knighthood, in recognition of the eminent services rendered by him during the many years he held that appointment.

MR. WOODS, sanitary inspector of St. Helens, was last week elected surveyor to the Penrith Local Board of Health in succession to Mr. Todd, resigned. There were twelve applicants for the office.

WEST LOOE, Cornwall, is about to be supplied with water by gravitation from a stream flowing into the Looe River. Mr. E. Appleton, of Torquay, is the engineer, and Mr. Stoney, of Looe, the contractor.

THE *Cologne Gazette* announces that Dr. Erisman, a pupil of Professor Pettenkofer, of Munich, has been applied to by the Russian Government to undertake the direction of disinfecting the battle-fields in Turkey.

THE tenders for the drainage of Plympton St. Mary churchyard are forcible illustrations of how authorities may differ, the lowest being 63*l.* and the highest 280*l.* The surveyor's estimate was 60*l.*

A MEETING of owners and ratepayers of the parishes of Clayton and Keymer, forming the ecclesiastical district of St. John the Evangelist, Sussex, has been held, and a resolution passed that it is expedient that the district should be constituted a local government district.

THE Town Council of Hereford have re-elected Dr. Vavasour Sandford medical officer of health for the city and county of Hereford for life at an increased salary of 150*l.* per annum instead of 125*l.* They also presented him with a cheque for 30*l.* as a gratuity for extra services during the epidemic of scarlet fever.

DR. ALFRED CARPENTER, M.D., C.S.S. Camb., of Croydon, has a work on 'Preventive Medicine in Relation to Public Health' in the Press. The volume will comprise a series of papers on Sanitation, Air, Sewage, Water, Hints upon the Management of Sewage Farms, etc. The work will be published in the course of the present month by Messrs. Simpkin, Marshall and Co.

THE following have been elected as the first local board and urban sanitary authority for East Dereham, Norfolk :—viz., Messrs. Charles Norton Elvin, William Freeman, Robert Potter, Charles Heyhoe Wigg, William Thomas Gidney, Matthew Carter, Leonard Elsdale Hatfield, Thomas Mackie, Arthur Massingham, Joseph Warren, Benjamin Brett, and Thomas Norton Nicholson. There were thirty-four candidates.

THE Joint Committee on State Medicine of the British Medical and Social Science Associations, has presented to the Earl of Beaconsfield a memorial, which concludes with the following suggestions: 1. That the present existing distinctions between urban and rural sanitary districts should be removed, and that all sanitary authorities should be clothed with similar powers; and that these powers should be extended in order to enable them to carry out all purposes of local administration within their district. 2. That in each county or division of a county a representative authority of a high order should be constituted for the execution of joint works, to aid, and in case of default, to exercise control over district sanitary authorities.

REPORTED OUTBREAK OF ASIATIC CHOLERA.

WE have made careful enquiry into the reported outbreak of Asiatic cholera at Byers Green, Durham, and can assure our readers, on the most unimpeachable authority, that there is no truth whatever in the statement which has obtained so wide a currency in the daily press.

PREVENTION OF FIRES.

THE Report of the Select Committee appointed to inquire upon the above subject have recommended that the present divided system of management should cease, and that the fire brigade should be transferred from the metropolitan board to the commissioners of police for the metropolis, so, however, as to constitute a distinct branch, to be placed under the immediate command of a separate assistant commissioner, and to be authorised to act within the City of London as well as in the metropolis. They also, among other things, recommend that hydrants should, without delay, be affixed to mains and service-pipes wherever there is a constant supply, and should follow the extension of such supply; that the water systems now belonging to the various companies should be consolidated in the hands of a public authority, which in dealing with the questions of constant supply, pressure, and pipage should be bound to have regard not only to the convenience of consumers, but also to the requirements for the extinction of fire. We have always concluded in our own minds that some such recommendations would ere long be authoritatively made, and we trust that effect will speedily be given by Parliament to these thoroughly sensible conclusions.

IMPROVEMENTS IN SLAUGHTER-HOUSES.

IT will undoubtedly lead to a great improvement in our slaughter-houses if the killing of cattle by the explosion of a small quantity of dynamite placed upon the foreheads of the cattle, be universally adopted. Experiments have lately been made by Mr. Johnson of Dudley in this very direction, and they proved very satisfactory. The charges were exploded by electricity. Two large horses and one donkey, which were unfit for work, were drawn up in line and a small primer of dynamite, with an electric fuse attached, was then placed on each of their foreheads. The wires were coupled up in circuit, and attached to the electric machine, which stood about five yards in front. The word 'ready' having been given, the handle of the machine was turned and discharged an electric current, which exploded the three charges simultaneously, the whole of the animals instantly falling dead without a struggle, and being ready for a cleanly bleeding.

It may not be proper to destroy fish in this way, be-

cause there is a danger of frightening the finny tribes from our shores, but from the above scientific experiment it is easy to see what a difference could be wrought in our shambles and in the atmosphere surrounding them, were the system to prevail generally.

THE WINDSOR DRAINAGE.

THE drainage of Windsor, which has cost the borough over 40,000*l.*, the application for the last loan of about 9,500*l.*, making in all 42,500*l.*, having been authorised at a special meeting, is now all but complete. Mr. Hawkesley, C.E., is the engineer, and under his direction a new brick sewer from the lowest part of the existing system has been constructed to the Ham at Old Windsor, adjoining the Windsor Castle Sewage Farm, crossing the navigable cut of the Thames at Old Windsor, the distance being about two miles. Tanks have been constructed at the Ham, where it is intended to treat the sewage by precipitation, the effluent water to be disposed of by filtration. At the meeting held on Tuesday, July 31, the committee, under whose direction the work has proceeded, presented their final report, which stated that negotiations had been entered into with M. F. Hillé, and the town council decided to adopt his system for the treatment of the sewage, subject to the preparation of the necessary contracts. It was stated that M. Hillé's system was the cheapest to work which the committee had investigated. It is expected that, in the course of a very short time, the further purification of the Thames will be effected by the entire diversion of the Windsor sewage. At a recent meeting of the town council, it transpired that the costs of the prosecution of the Windsor Town Council by the Thames Conservators had amounted to 137*l.*

DISINFECTION OF BEDDING, ETC.

IT would be a boon of great price if everyone of our large towns and cities were supplied with a disinfecting and purifying works such as there is, for instance, in Birmingham, where, in cases of small-pox, scarlatina, typhoid fever, and diphtheria, and the like, articles of bedding, bed furniture, and wearing apparel can be subjected to the Dry Heat System, or 240° to 260° Fahr., and washed in a steam laundry afterwards. At Birmingham, six of the large hospitals and six of the larger scholastic institutions are connected with the works there, whilst incalculable benefit is derived by all classes of private subscribers. Householders can have feather beds purified and relieved from lumpiness, animal perspiration and grease; their ticks can be cleaned, and carpets, and even books restored to a condition of purity for a trifling sum. Ladies also, whose furs are attacked by moths, can have the latter effectually destroyed without injury to the fabric, and even vermin from bedhangings, etc., can be removed with equal ease. Nurses can have their clothing also efficiently disinfected, as can also medical men who have lately attended puerperal fever cases. At present we are, in London, far too insufficiently provided with institutions of this kind. When an epidemic assails a household here the managers of that household have mostly to rely upon themselves for the work of purification, and are bound to resort to sheets wrung out in carbolic acid and water, and later on upon sulphur fumes and the like. In Birmingham, on the contrary, one has only to write to the works and ask them to send for the parcel of clothing or bed-linen, and return it, when disinfected, washed and mangled. It appears, too, that the works are largely patronised throughout the country, and that from far-off Wales and distant Sussex people are glad to avail themselves of them, when infectious disease has invaded their houses.

RECREATION FOR CHILDREN IN TOWNS.

SOME time since a deputation from the National Health Society, headed by Mr. Shaw Lefevre, M.P., Mr. Thomas Hughes, and Mr. Ernest Hart, Chairman of the Executive Council of the Society, waited upon the London School Board to present a memorial, which bore the signatures of the Duke of Westminster, the Archbishop of Canterbury, and other well-known influential persons, urging that the large total of open space, consisting of playgrounds attached to the schools belonging to the London School Board should be fitted with recreative apparatus, and opened after school hours and on Saturday afternoons to the children of their several neighbourhoods, under suitable regulations. It is with very great satisfaction we learn that a letter has been addressed to the National Health Society by the London School Board, that they would grant the prayer of the memorial to the extent of fitting up forthwith twelve of the largest playgrounds in a suitable manner, adding that they wish the society to undertake the expense of the necessary superintendence of the playgrounds. Considering that such expense could not be large, and that difficulties might arise by the divided authority, we trust the latter part of the board's resolution will be modified. In any case it will be a great boon to children in crowded neighbourhoods, and become not the least of the benefits conferred by the School Board system. It is an excellent example, and one which we trust the school boards in other towns will not hesitate to follow.

SHANTIES AT BICKERTON.

MR. DAVENPORT, the energetic surveyor of the Nantwich rural authority, has lately spent in the course of his duty a few days in the township of Bickerton—Egerton will follow next—with a view of ameliorating the sanitary condition of the squatters who reside upon the property of Sir Philip de Grey Egerton, a name renowned in geological research, and very much that is amusing as well as sad in the condition of these people has made itself manifest to him, to Mr. Beckett, the agent, and to the builder appointed to carry out the improvements contemplated in each case. Mr. Davenport has been able to strike successfully at the root of this squatter difficulty, so far, at least, as insisting upon sanitary matters being attended to, and it is pleasant to know that the trio have been able to even arrange a system of closets for compulsory use in the tenements, if the condition of the dwellings can be saluted with so high a title. One of them, yclept 'Grindlestone Hall,' revealed the tenant in bed with an umbrella of huge dimensions over her head, and there she lay, Ajax-like, defying the storm of importunate rain, and hardly knowing what to make of the commissioners, who were engaged in their house-to-house visitation, and had taken hers on the way. The wonderful part of the revealed story is that some of these tenants only pay about 2*s.* per annum for these homes, which are for the most part single rooms built against the rock, like Arab or Irish huts, and these are approached through a labyrinth of gorse and heath. And the most curious part of the story lies in the fact that Sir Philip Egerton gives each of these poor people a half-crown dinner yearly, thus losing by the transaction. He is to be congratulated upon deciding to rid that most beautiful domain of these fifteenth century hovels, and upon accepting the mediation of so valuable a public officer.

SEWAGE DISPOSAL.

ON the 17th ult. the sewage disposal works at Barnsley were opened, though not completed to the full extent of the operations intended. The treatment of the sewage is intermittent downward filtration through natural soil, associated with surface irrigation. The works were designed and carried out under the directions of Messrs. Bailey Denton, and Co., of Whitehall Place, and they were declared on Tuesday to have been successful. The ex-mayor, Mr. Alderman Carter, said, when addressing his fellow-townsmen at the opening, 'I am confident in saying that what you have done has every prospect of success, and the treatment of the sewage on the bold and general principle which this town has resolved to adopt is, in my

estimation, already pledged, so far as success is concerned, to the most satisfactory results which you could expect. I may therefore say, on behalf of the committee, who have watched this operation with so much anxiety, and who have looked to the carrying out of these works with so much assiduity, that the committee are well satisfied with the works from beginning to end.' The population of Barnsley is upwards of 25,000, and the area of land laid out for intermittent filtration is thirty acres, the soil being a loam in which there are fair proportions of sand and clay. At present only ten acres are prepared out of the thirty acres, the remaining twenty acres being in hand, and the area of land used for wide irrigation is limited to fourteen acres. The whole area of land purchased by the corporation is between seventy and eighty acres, which Mr. Bailey Denton, who is an advocate of the combined treatment of intermittent filtration with surface irrigation, which allows of the extension of the one and the curtailment of the other to meet local conditions, considers it an ample provision for all time. We are informed on the best authority that the amount actually laid out on these works up to the present does not amount to 2,500*l.* This is, of course, exclusive of the cost of the land, which was considerable.

SANITATION AT WHEATHAMPSTEAD.

THE medical officer of health for the St. Albans rural district has lately presented his report, and considerable interest has been manifested in it, owing to its practical tone, and the fulness with which it meets the local wants of the village of Wheathampstead. We make the following extracts from it, as likely not only to interest but instruct many of our readers.

'My very extensive analyses of the waters of Hertfordshire,' says Dr. Saunders, 'have shown me how frequently a water unpolluted by sewage from the most usual source, viz., from adjacent cesspools, is yet rendered extremely impure by filth washings on the surface of the ground, and hence it is of extreme importance to protect all wells by a good curbing, say one foot in height of brick built in cement, and also to cement the upper four or five feet of the well steyning to keep out surface water.'

After speaking of the system of precipitation practised at this village, he expresses his opinion that for any process of precipitation to be successful, one of the first essentials is that the sewage, after being treated with chemicals, should be kept at rest, so that the precipitate may fall, and the supernatant liquid flow off without disturbing the solids. This can only be done, he adds, by making a tank in compartments so as to lessen the disturbing influence of incoming sewage.

At Wheathampstead there is simply a long, shallow tank, about 50 by 12 by 4 ft., in which the sewage is always in commotion, and the solid matter so churned up by the mere force of the sewage and the wind (to which the tanks are fully exposed), that it passes out with the effluent, and can be detected far away down the ditch in which the effluent flows to the river. No provision whatever is made for separating coarse solids, such as corks, rags, paper, etc., and solid fæces which had passed through the tanks can be seen in various parts of the ditch far beyond them.

Dr. Saunders further advises that the tanks be protected from the wind, which might easily be done by placing covers such as are used by brickmakers over them. The force of the wind very materially interferes with the non-disturbance of the sewage, and it is upon this state of rest that the effectual subsidence of the solids depends. We trust that these most sensible recommendations will be duly followed out.

REDDITCH DRAINAGE.

WE noticed in our issue of March 30 last, that the Board of the town of Redditch was shortly about to deal comprehensively with its drainage, and trusted that no local differences would stand in the way of a speedy and satisfactory solution. But this happy state of things has not yet been arrived at, and we just learn from local sources that at the usual monthly meeting of the board on July 2, a long explanation was made by the chairman accounting for the delay, and setting forth the differences which had arisen with respect to the carrying-out of Mr. Roberts' scheme. Mr. Roberts appears to have been obliged to add considerably to his first estimate, and according to the chairman the first estimate of 4,300*l.* has swelled by extensions not provided for into some 8,569*l.* The chairman and his colleagues appear to prefer the scheme of Messrs. Gotto and Beesley, which comes out at 8,206*l.* and might, perhaps, by employing the board's surveyor as clerk of the works be reduced to 7,606*l.* The report goes on to say that if the Government inspector, Mr. Morgan, C.E., prefers the scheme of Mr. Roberts, they would carry it out to the best of their abilities; and they believe that if the outfalls are removed far enough, and the sanitary additions pointed out are made, it will prove a good scheme, but very costly to establish and expensive in working. If, on the other hand, that of Messrs. Gotto and Beesley be selected, they believe it will be found to comprehend all the requirements of the town, and to be economical, both now in construction and afterwards.

All these considerations appear, we cannot help thinking, to have made their appearance late in the day, and does not speak well for the conduct of business. The altercation has also, according to the chairman, resulted in the breaking up of old friendships, the loss of business, anonymous letters containing threats of personal violence, virulent attacks upon private character, and unmeasured abuse from the public platform. He adds that he regards the recent attempt at postponement for two years as serious, and that it would be in the highest degree impolitic and intolerable to continue the present agitation. He says, moreover, that if a postponement were announced, legal proceedings would be at once commenced to compel the abatement of nuisances in several distant parts of the town, and does not see how these distant points can be improved except by a compulsory scheme. It is a pity that such a deadlock should have come in the way of work urgently needed.

Special Reports.

REPORT OF THE INSPECTORS OF FACTORIES.

THE report of Her Majesty's Inspectors of Factories for the half-year ending June 30, 1877, has just been presented to Parliament. In their joint report the inspectors refer to the bill now before the House of Commons for the consolidation of the various Factory and Workshop Regulation Acts. A comprehensive measure, they remark, will, no doubt, be a great assistance to those who have to administer these Acts, as well as an advantage to those who have to observe them. Few years, Mr. Redgrave says, have now elapsed since the passing of the Factory Act, Extension Act of 1867, and the Workshop Regulation Act of the same year. These laws placed restrictions upon every occupation in the country not previously regulated, and Mr. Redgrave gives an interesting review of the manner in which these Acts have operated, and appends some suggestive extracts from the reports of his sub-inspectors on the subject. The application of factory regulations to the miscellaneous occupations of the country appear to have been attended with a measure of success which is altogether surprising. The improvement of the sanitary condition of workshops and factories, the enforcement of cleanliness and proper ventilation, and the prevention of over-crowding appear to have occupied a large share of the attention of the inspectors under the Acts of 1867; and Mr. Redgrave says that on looking back on the work done in this way he can claim for it a value quite as important as for the work done under the old Factory

Acts in the way of regulating the hours of labour and preventing and checking those evils which followed from exhaustive and excessive work. Mr. Owen, sub-inspector of the East Metropolitan sub-division, speaking of the importance of sanitary regulations in a factory or workshop, expresses his regret that many of the difficulties to be overcome arise from the conduct of the workpeople, the employers generally being willing to adopt any reasonable means for improving the condition of the workshops, provided those employed co-operate in the efforts for their benefit. Mr. Owen looks forward with satisfaction to the proposal in the new Factory Bill to give the inspectors an increase of authority in respect to sanitary measures, and which would enable them to deal with such matters before any complaint arises. One of the most troublesome occupations to regulate of which the inspectors seem to have had experience is that of brickmaking, but the evidence of the success which has attended their efforts is conclusive. Thus Mr. Lakeman, the sub-inspector of the eastern counties, of whose work Mr. Redgrave expresses his high appreciation, says: 'The change that has been wrought in my brickfields generally has been very great, and those in which the greatest improvement is visible are worked by temperate moulders. The other day I timed a double stool moulder, who made fifteen bricks a minute. He knew not that I was so doing, and on my asking him how many he made a-day replied—"Me and my mate make 7,000 on an average, but then we work regular hours, six to six, and no drinking." As soon as men become sober, overwork is stopped, more average hours are put in, and, of course, more money is earned.' Mr. J. A. Redgrave, the sub-inspector of Kent, Surrey, and Sussex, gives the evidence of the manager of a large brickfield, which shows that the men, by working steadily under regulation hours, produce more on an average in the season than when they were in the practice of working overtime. Mr. James Henderson, the sub-inspector of the West Metropolitan Sub-Division, also speaks confidently of the beneficial influence of the Factory Act on those employed in brickmaking. In West Middlesex and Buckinghamshire the Act, Mr. Henderson says, 'has been accepted by both employers and work-people. The employment of young girls in the fields has been abolished, and the Act generally is fairly well observed. . . . Wages have risen, and drinking has diminished, although, no doubt, there is more of the latter still indulged in than is good for the people. In Middlesex the price paid for making bricks has been as low as 3*s.* 4*d.* per 1,000. Ten years ago it was 3*s.* 10*d.*; this year (1877) it is 4*s.* 11*d.*' Mr. Lakeman calls attention to a practice which seems to prevail among some brickmakers in his district, and which certainly appears to be very prejudicial to health. Mr. Lakeman thus describes it: 'The testimony of most old brickmakers is loud in condemnation of the system of treading earth. Dislocated limbs, chronic rheumatism, paralysis, consumption are traced to this cause. What I have seen urges me to lay before you my opinion that it ought not to be allowed. Boys are generally chosen for this work, which is done the first thing in the morning or the last at night. The earth is then very cold, having been dug out fresh from the mass, water is abundantly thrown upon it, boys with naked legs and bare arms tread this clay into a proper consistency, and are at times so employed for two hours together. The fatigue that follows is visible—the muscles are tried too much, the loins give way, and spinal weakness ensues. I assure you that I am often asked, "When will you stop earth treading? We want that stopped as much as anything else." It was only last week that I saw a moulder, thirty-seven years of age, whose legs are paralysed. He attributes it to treading earth after his day's work. He told me that the cold struck up through his legs. He took to his bed, got a numbness in his back, and lost the use of his legs.' A pug mill in which this most laborious and distressing work could be done can be fitted up, Mr. Lakeman says, at a cost of 4*l.* The sub-inspector here makes out a strong case for further restriction. Mr. Henderson makes a lengthy report upon the influence of factory restrictions upon the leading occupations in the metropolis which contains much interesting information. He says employers are themselves astonished at what has been done in the way of regulating the hours of work, reducing the unreasonable demands made upon them by merchants, and enabling them to employ their workpeople under conditions at once more healthful and more profitable to all concerned. '"You have come to ruin us," was the greeting,' says Mr. Henderson, 'which I received from one of the largest manufacturers of artificial flowers when I called upon him after the passing of the Act of 1867, and informed him that there was to be no work allowed after 8 P.M. "Our business is too fanciful and too fluctuating to stand such an arbitrary law, and you will certainly destroy the trade in this country." But what was the result? A year afterwards the same gentleman acknowledged that the Factory Act had been a positive blessing to him. He now got as much work out of the hands of his workpeople in 10½ hours as he had formerly got in 12 or 14; and in one season he effected a saving of over 30*l.* in his gas bill.' Mr. Henderson says that the industrial history of London during the last ten years has been a marvellous story of rapid progress and development. He does not seek to attribute this for a moment to the influence of the Factory Acts, but claims that it is a proof that they have not stood in the way of a profitable and successful prosecution of business. The introduction of the sewing machine has revolutionised the conditions of employment for women and girls in London, and it is to the large increase in the number of them employed and the advance which has taken place in their wages that Mr. Henderson mainly attributes the important diminution in pauperism which has taken place. The numbers of paupers in London has diminished nearly one-half since 1870, and there has also been quite as large a reduction in the number of known thieves and bad characters. Among other trades to which Mr. Henderson refers in detail in his report are bookbinding, letterpress printing, artificial flower-making, dress-making and millinery, and plain and fancy boxmaking. In all these he shows that the application of the Factory Acts has been followed with most beneficial results, and that the restrictions have in no way interfered with the successful prosecution of even the most sensitive and fluctuating business. Mr. Robert Baker, in his report to the Home Secretary, alludes to his resignation in the hands of the former after a continuous service in the department since the year 1830. The factory law, as it now stands, Mr. Baker, quoting Lord Shaftesbury's words, regards as a 'healing measure.'

THE SALE OF FOOD AND DRUGS ACT.

At the last meeting of the Newington Vestry, Mr. H. R. Silvester in the chair, a letter was read from the Local Government Board, desiring to be informed what steps the vestry had taken to put into force the provisions of the Sale of Food Act; and it was resolved, on the motion of Dr. Cortis, seconded by Mr. Charles S. Barker, 'That the Board be informed that the vestry did not consider it advisable to take any action in the matter beyond appointing an analyst to receive samples from any parishioners who might consider themselves aggrieved.'

At the Lambeth Vestry, recently, Mr. Churchwarden Burrup in the chair, a report was read from Dr. Muter, the analyst, stating that during the past quarter he had received and analysed seventy-three samples, including milk, gin, whisky, brandy, tea, coffee, mustard, vinegar, etc. Only a sample of mustard and one of bread were found to be adulterated. His account for the quarter was 36*l.* 10*s.* Mr. F. H. Fowler, in moving the reception of the report and its reference to the Sanitary Committee, stated that they had for some time had under consideration their arrangement with Dr. Muter. Certainly for the small return which had been made 36*l.* was a large sum. It was satisfactory to find that articles of general consump-

tion were so free from adulteration, and it also reminded them that they might be spending too much money in putting an Act into force for which there was not anything like the necessity that it was at one time considered there was. The motion was carried.

At the last meeting of the Bath Town Council, Mr. Gatehouse, city analyst, presented his first quarterly report, from which we gather that thirty-one articles had been analysed by him. Of these twenty-one were found pure, and ten more or less impure. Milk formed the bulk of the commodities tested, the samples numbering nineteen, of which it is satisfactory to know that as many as thirteen were found pure. Among the rest of the articles analysed were beer, butter, bread, and beef sausages, and in each instance, though only a few samples were tested, adulteration was detected. Preserved peas, which recent revelations have caused to be regarded with suspicion, were proved by Mr. Gatehouse to fully merit their ill-repute. Of four samples submitted to him by private individuals three were found adulterated with copper. The labours of Mr. Gatehouse during the quarter clearly demonstrate the great need that exists for a public analyst in Bath, inasmuch as about one-third of the articles submitted to his examination, exclusive of those sent by private individuals, were found to have been tampered with.

THE IMPROVED INDUSTRIAL DWELLINGS COMPANY.

THE twenty-eighth half yearly general meeting of the members of this company has been held at the Mansion House, under the presidency of Sir S. H. Waterlow, M.P. The report of the directors was taken as read. The chairman, in moving its adoption, congratulated the shareholders on the financial position of the company and the condition of the property. The dividend recommended—viz., 5 per cent. per annum—had been fairly and more than earned by the rentals received by the company. They might also congratulate themselves that during the half year they had spent more money than in any preceding half-year of the existence of the company. The capital of the company now consisted of 455,673*l.*, and they had spent during the past half-year 30,366*l.*, and the income for the half-year had been 19,865*l.*; the total expenditure had amounted to 11,788*l.*, leaving a balance of 8,721*l.*, which included a sum of 644*l.*, repaid to the Public Works Loan Commissioners on account of principal. The accounts would have shown 1 per cent. more earnings, but the company had always charged interest on unproductive capital to revenue, and during the past half-year that had amounted to 1,500*l.* The gross receipts from rent had been 19,465*l.*, or 532*l.* more than in the corresponding half of the previous year. The loss by empties and defaulters had only been 12*l.* 12*s.* 3*d.*, but against that they had 22*l.* in hand on deposits. The expenses of management had only been 563*l.* for salaries, and 229*l.* for office rent, printing, etc. That sum was a fraction under 4 per cent. of the income. The company were engaged in covering two large estates—one at Chelsea and the other at Highbury—with artisans' and labourers' dwellings. In the block recently opened at Goswell Street the whole of the tenements were let, and nearly all the shops had been let at good rentals. The death-rate in the company's dwellings had been 16·5 per thousand, as against 22·3 in the metropolis generally. Mr. Alderman Finnis seconded the motion. In reply to a question, the chairman said that this company was totally distinct from the Artisans' Dwellings Company, against the secretary and one of the directors of which charges were now pending. The report was adopted, and the proceedings terminated with a cordial vote of thanks to the chairman and directors for their honorary labours.

THE *Globe* states that a great part of the district supplied by the Chelsea Water Company has been without a supply of water since Saturday morning last, in consequence of the breaking of the main pipe.

Medical Officers' Reports.

EPSOM RURAL SANITARY DISTRICT.—This report extends over the years 1874–6, and gives an account of the situation, soil, and general sanitary arrangements of the district, as well as the usual sanitary statistics, including the occupations of the people. The population is estimated at 20,015, of whom as many as 7,152 are female domestic servants, so that no less than 84 per cent. of the females of the district above twenty years of age are servants, and we should therefore expect a very low death-rate. Dr. Jacob says that the drainage arrangements are not good, 'as none of the villages in the district have any recognised system of sewers,' and the privies or cesspools are rarely watertight, and when in clay soil generally have an overflow into a ditch. The number of births registered in 1876 was 896, and of deaths 465, giving a birth-rate of 31·2 and a death-rate of 15·9 per 1,000 living. The death-rate from the seven chief zymotic diseases was 2·4, and from consumption 1·6 per 1,000 living. The proportion of deaths to registered births was only 10·8 per cent. which is singularly small. The average annual death-rate for the three years was 15.9 per 1,000 living.

HEBBURN.—The population was estimated at 9,000, the birth rate at 51·0 and the death-rate at 20·4 per 1,000 living, which is very much below the average, as it was 35·0 in 1874 and 28·4 in 1875. The infant mortality, under one year, was 16·3 per cent. of the total births. The death-rate from the seven chief zymotic diseases was 4·6 per 1,000 in 1876, and as high as 8·1 in 1875. The number of deaths from diarrhœa was large, and from consumption unusually small. The drainage of the colliery village is bad, and the dwellings of the colliers structurally bad, so that the stench from the middens and collections of surface water in hot weather 'is sometimes almost intolerable.' Dr. Spear believes the outbreaks of typhoid to arise chiefly from these causes.

LEEDS.—Dr. Goldie's report for June shows that the annual birth-rate was 37·8, and the death-rate 20·9 per 1,000 living. The mortality amongst children under one year old was only 12·3 per 100 births, and from seven zymotic diseases 2·2 per annum in each 1,000 population. There were three deaths from diphtheria, occurring in a street in which there are foul cesspools and no main sewer. There was one case of imported small-pox, which led to others in the same house before Dr. Goldie knew of it, so that he fears the disease will spread, as the house was much frequented by the neighbours. Everything was disinfected, as well as the house and clothes of one of the visitors.

GLASGOW. — The report for the quarter ending March 31, 1877, is accompanied as usual with two most elaborate tables, showing the deaths from various causes and at different ages in each of the statistical subdivisions of the city. It also contains a meteorological table for each month during the last ten years. The average death-rate for the quarter during ten years was 33, whilst in 1877 it was 29, which was 3·4 per 1,000 above the mean of eight principal towns of Scotland. The birth-rate was 38 per 1,000 living. The death-rate was 185 per 1,000 living under one year, and 17 per cent. of the total births. By far the largest number of deaths occurred from diseases of the lungs, but, as Dr. Russell includes consumption under this heading, this might have been expected. The death-rates in the subdivisions varied between 53½ in High Street and Closes, East, 53 in Bridgegate and Wynds, and 15½ in Monteith Row. These differences cannot depend alone on the varying sanitary conditions of the inhabitants, but must be greatly modified by their social position. This is well illustrated by the varying proportion of uncertified deaths of children, as in the worst groups the percentage was 47, and in the best 14½, of the total deaths under one year, showing that want of medical

attendance and proper care caused a very large number of infantile deaths. Dr. Russell makes some important remarks and suggestions respecting the insurance of the lives of illegitimate children.

Parliamentary Proceedings.

HOUSE OF LORDS.

(*Wednesday, August* 8.)

CANAL BOATS' BILL.

THE Duke of Richmond and Gordon moved the second reading of the Canal Boats' Bill. He said it was impossible to ascertain the exact amount of this floating population, but it was supposed to be from 29,000 to 80,000. The condition of these persons was deplorable. The men, women, and children were in the grossest state of ignorance, which was lamentable in a country like this. The education of the children was neglected, and from their crowding, in most cases the man, his wife, and six, seven, and eight children living in a space of as many feet, engendered infectious diseases, which these boats were the cause of spreading throughout the country. The royal commission recommended the adoption of very stringent measures, but the Government had not thought it advisable to go to the extent of their recommendations, but they had proposed a bill which they thought would, for the present, meet the requirements of the case.

The Earl of Shaftesbury expressed his thanks to her Majesty's Government for having introduced this bill and their being able to carry it this session. The Government had acted wisely in dealing with the subject in a tentative manner. No doubt they would ultimately carry out the whole of the recommendations of the royal commissioners.

The bill was then read a second time.

HOUSE OF COMMONS.

(*Thursday, August* 9.)

SALE OF FOODS AND DRUGS ACT.

MR. SAUL ISAAC moved the second reading of the Sale of Foods and Drugs Act Amendment Bill, the object of which is to exclude from the operation of the Act mentioned spirits reduced in strength by the addition of water.

Mr. Meldon suggested the recommittal of the bill with the view of inserting a clause to limit the exemption to spirits not reduced more than 25 degrees under proof.

Dr. Cameron moved the adjournment of the debate.

Mr. Sclater-Booth objected to the bill being recommitted, and pointed out that it was not a new piece of legislation, but an attempt to remove difficulties as to the interpretation of a clause in the Adulteration Act about which there was at present some obscurity.

Dr. Playfair contended that the bill introduced a material alteration in the principle of the Adulteration Act.

The motion for the adjournment of the debate was negatived by 42 to 20.

Mr. Blake moved that the House do now adjourn.

Dr. Cameron was supporting the motion when an unsuccessful attempt was made to count out the House. The hon. member was proceeding with his remarks when another 'count' was moved, and, there not being forty members present, the House stood adjourned at ten minutes past eleven.

Law Reports.

TRACTION ENGINES.

MR. JUSTICE FRY has had before him the case of *The Attorney-General* v. *Mouss*. This was an information and action brought to restrain builders from taking traction engines over the Ax-bridge at Axmouth, in the county of Devon. The informants and plaintiffs were the county bridge surveyor and a person under contract to keep the bridge in repair. The bridge had been surveyed and found insufficient to bear weight beyond that of ordinary traffic, and a notice, under the Highway Locomotives Act, was fixed on the bridge. The action was not defended, and an injunction was granted.

ADULTERATED MUSTARD.

AT the St. Columb Petty Sessions, Kitty Cobeldick, shopkeeper, was charged with selling mustard, which was adulterated. A police officer deposed he went to defendant's shop and purchased three ounces of mustard, for which he paid 3*d*., and handed it over to his superintendent, who was outside. The mustard was taken from a tin which would contain six or seven pounds. The superintendent deposed that he sent a portion of the mustard to the public analyst, from whom he received a certificate stating that the mustard contained from 20 to 25 per cent. of flour and colouring matter. The defendant's assistant, who sold the mustard, said he did not do so with the knowledge that it was not pure. As, however, the mustard was sold without the remark that it was a compound, the bench considered that defendant came within the Act, and she was fined 6*d*. and costs, which amounted to 1*l*. 1*s*.

EXPOSING A PERSON SUFFERING FROM SMALL-POX.

JOHN BROUGHALL, cab proprietor, at Birkenhead, has been summoned for exposing J. W. Roberts, suffering from small-pox in the patients' room at the borough hospital. Roberts took the small-pox on the 13th ult., and defendant took him down to the relieving officer. Mr. McNerney, seeing the condition of the man, ordered Broughall to take him home and get a doctor to see him or he would give him (Broughall) in charge. Broughall afterwards took Roberts to the borough hospital, and he was allowed to mix with the other patients. One of the doctors ordered defendant to take him home. On arriving at the house he only stayed a short time, when he was turned out by defendant, and he took refuge in his aunt's house. After remaining there a short time, Roberts was removed to the hospital. In consequence of the conduct of defendant two cases of small-pox had occurred in the house, and one in the barracks. There were two other charges—one of exposing the bedding in the yard, and another of neglecting to disinfect the premises. The Mayor dismissed the first charge, as there was doubt as to defendant's liability in exposing the man at the borough hospital. Defendant had behaved with great inhumanity in turning Roberts out of doors. For exposing the bedding a fine of 5*l*. and costs (6*l*. 4*s*. 6*d*. in all) was imposed. The summons as to the other offence was adjourned for a week, to give defendant an opportunity of disinfecting the premises.

EXPOSING DISEASED MEAT.

J. WHITBY, W. Selby, and T. Wilford were severally charged with removing diseased meat for the purpose of exposing it for sale at Radford. Mr. Harwood (clerk to the Radford local board) prosecuted. Inspector Ratcliffe said that on the evening of July 20, he saw the defendants with four quarters of beef in a horse and cart. Wilford was, however, standing some little distance away, and said he had nothing to do with the affair. His name was upon the cart. The other defendants said they were going to use it for the pigs. Had every reason for supposing the meat was being removed for the purposes of sale, because each quarter was carefully wrapped up. The medical officer was called to see the meat, which he condemned. The cart stood in a road which led to the stable of a man where a cow had died the same morning. Selby said he had bought the meat, and was going to send

it to London as cats' meat. Herbert Francis Zalinsk chief goods clerk at the Midland railway goods station, said that on the day named Whitby came to the station, and said he wanted a hamper and cloths for conveying meat to market. They were supplied. Understood that the meat was good, or different hampers and cloths would have been used. This concluded the case for the prosecution, and the Bench said they thought that nothing had been proved against Wilford, and discharged him. The Bench having retired to consider the case, Mr. Thackeray, addressing the defendants, said they found them both guilty. He himself could speak to the condition of the meat, and the careful manner in which it was dressed, and he quite disagreed with their advocates that in disposing of flesh for cats and dogs it was necessary to dress it in that way. It was carefully dressed and wrapped up, and the authorities had the hampers and cloths, and there was no doubt the meat was being sent to London for human food. Under such circumstances it was generally very difficult to bring the case home, and therefore when that was accomplished the Bench must always be very severe. Whitby would be fined 20*l.*, and Selby 10*l.*, with the alternative of three months' and two months' imprisonment respectively with hard labour.

NUISANCE FROM SULPHURIC ACID FUMES.

AT the recent Surrey Assizes *The Queen* v. *Wallace* was tried. This was one of two prosecutions instituted by the Wandsworth Board of Works against manufacturers at Battersea, for nuisances alleged to be injurious to health. Messrs. Wallace, manufacturers of sulphate of ammonia, a product of the refuse liquor of gasworks, treated with sulphuric acid and lime, etc., and afterwards used as manure. The case for the prosecution was that in the process of treating the gas refuse—a liquid highly charged with ammonia—with sulphuric acid, highly baleful fumes were evolved, not only odious and sickening to the smell, but distinctly injurious to health; and many witnesses were called to prove that it was so. On the other side as many witnesses were called to prove the contrary—that the smell was not so very bad after all, and that it was smell and nothing more, and no injury to the health. It may be mentioned, as showing curiously how the number of witnesses in a case may be reduced in the course of a trial, that it was stated before the case came on that there were about 300 witnesses in it, whereas there were hardly fifty on both sides. This was because it was arranged to take a group of witnesses under each head on both sides, as representative witnesses, and so the number on both sides was reduced. Nevertheless, the trial lasted five days, and after all came to an abortive end.

The learned Judge summed up to the jury most carefully, but they were unable to see their way through the mass of contradictory evidence on both sides, and so, after being locked up five hours, they were discharged without giving a verdict, leaving the parties to all the delay, expense, and vexation of another trial.

The other case was a prosecution against the Alum and Ammonia Company, whose process is different though dealing with a similar material, and with the aid of sulphuric acid. Nine of the jurors had had a 'view,' but seven of them were engaged in the Dulwich College case, and so it was found impossible to make a jury, and the case stands over.

Reviews.

By-Laws and Regulations with reference to House Drainage. Adopted by the Uppingham Sanitary Authority, and allowed by the Local Government Board. With Explanations and Suggestions. By ROGERS FIELD, M. Inst. C.E. London: F. and F. N. Spon. 1877.

THERE are some literary productions which can only be properly judged by offering to the reader excerpts from the works themselves, and this is one of them. Everything necessary is so tersely put, and the language used so weighty and so well chosen that a paraphrase of the pamphlet before us is perfectly impossible, while a dilution of its contents for the exigencies of review would only spoil its admirable sense, and produce dissatisfaction in author, reader and reviewer alike. The least of the merits of this pamphlet is its cheapness.

The work is divided into three portions, beginning with an 'Introduction,' from which we cannot resist quoting the following:

'The two chief objects of a perfect system of house-drainage should be (1) The immediate and complete removal from the house of all foul and effete matter directly it is produced. (2) The prevention of any back current of foul air into the house through the pipes or drains which are used for removing the foul matter.

'The first object—immediate removal of foul matter—can commonly be best attained by the water-closet system when carried out in its integrity, though in certain cases a system of earth or other dry closets may be preferable. Cesspools do not fulfil this condition of immediate removal. They serve for the retention of excremental and other matters, and they are inadmissible where complete removal can be effected. Where this is not possible and cesspools must be had recourse to, they must be most carefully designed, and must on no account be placed in the immediate neighbourhood of any dwelling.

'Many kinds of water-closet apparatus and of so-called "traps" have a tendency to retain foul matter in the house, and therefore in reality partake more or less of the nature of small cesspools. These again should be discarded. This is especially the case with the ordinary 'pan-closet' arrangement of water-closet, as I can testify from actual experience, having frequently had them taken to pieces and the traps cut open, when I have invariably found them more or less foul. This description of closet is largely in use at the houses examined; and, although a well-kept pan-closet cannot be condemned as necessarily injurious to health, it should always be looked upon with suspicion and be avoided as much as possible. The so-called 'D traps' are specially objectionable. This question of internal fittings is of much greater importance in a sanitary point of view than would at first sight appear, as nuisances are frequently attributed to the ingress of 'sewer gas' which have nothing whatever to do with the sewers, but arise from foul air generated in the house-drains and internal fittings.

'The second object of perfect drainage—the prevention of a back current of foul air into the house—is of the utmost possible moment, as, unless it is attained, the drainage may do harm rather than good. Indeed, it is not too much to say that if proper means are taken to secure this object no foul air can enter houses from the public sewers; while, if these precautions are neglected, no degree of care given to the public sewers will prevent risk of sewer air entering houses.'

Mr. Field then goes on to lay particular stress upon the fact that water traps are insufficient to protect a house from a palpable back current of foul air, and that there exists an absolute necessity for ventilation and disconnection. He gives an example where, when examining a Sanatorium, he found a bad smell in two lavatories attached to water-closets situated one above the other. Further investigation, says Mr. Field, 'showed that this smell did not proceed from the water-closets, but from the lavatory basins, where a decided current of very foul air was coming into the chamber from the unplugged outlet of the basins, and it was found that each basin was connected directly with a pipe which discharged into a partially closed gully outside the house, covered with snow, and this again into a cesspool. On opening the gully it was ascertained that the outlet was properly trapped, and that there was no apparent escape of foul gas, but that the water in the gully (though clear) had a very bad smell In order to test whether this arose from any passage

of foul gas through the trap, clean water was poured into the gully, and this removed the smell.' The gully was then examined again after a few hours, and it was found that the water had assumed a very decided smell. The experiment was repeated with the same result, and it appeared that the longer the water was left after it was changed the fouler it got. Moreover, on closing the gully again after the water had become foul, the foul current of air returned in the lavatory. There could be no question, therefore, but that the smell arose from the passage of foul air from the cesspool *through the water-trap*. The waste-pipes from the lavatories were carried vertically down to within two inches of the water surface, so that even if the gully had been fully open to the air there would not have been a sufficient break between the gully and the waste-pipe for perfect disconnection. This was shown to be actually the case, as when the stone slab covering the gully was removed, the smell in the lavatory was not absolutely removed, though greatly diminished. The above is an excellent instance both of the uselessness of mere water-traps to prevent the back current of foul air from sewers into the house, and the care that must be taken in the details of construction to ensure perfect disconnection. . . . I have had opportunities of observing several other instances of foul gases passing through the trapping water by being absorbed on one side, and given off on the other, and am convinced that this is of frequent occurrence. The passage is, however, gradual, so that if the surface of the water in the trap is freely exposed to the air, the foul gases given off from the water-surface are immediately so diluted and dispersed as to be imperceptible. If, on the other hand, the water-trap is in a closed pipe or drain, the foul gases which pass through the trapping water will accumulate on the house side of the trap in sufficient volume to demand attention.'

We have quoted this case in full, because the cause of the smell and the remedy are so clearly put that it cannot fail to be of interest. With reference to the soil-pipe arrangements of a house the essential point is stated to be an opening to the air at its lower end, as well as at its upper end above the roof. The necessity of a water-trap, however, between the sewer and this lower end severance is pointed out, which being done, a current of pure air will be created through the soil-pipe. In the case of draining into a cesspool this disconnection and ventilation is even more imperative, and lest the unwary householder should be tempted to ventilate the sewer by way of his soil-pipe, Mr. Field quotes at some little length the experience recited by Dr. Buchanan as to the danger of thus 'laying on' the sewer air to the house in this way. 'It is not the business of householders to ventilate public sewers; that is the affair of the authority to whom those sewers are vested.' Nothing can be more easy to understand than all this.

The second part of the pamphlet contains a series of extracts from the by-laws of the Uppingham sanitary authority, prepared by Mr. Field in 1876. This refers more particularly to the due fall of the drain-pipes—the necessity for excluding them from the insides of houses where at all possible, and of covering them with concrete when they do pass inside a house, the provision for an effectual flushing, the use of ventilating pipes and a properly constructed trap between the residence and the sewer, the trapping of every closet and slop-sink with some trap other than a D trap, the wisdom of removing cistern overflow, bath, lavatory, or 'safe,' waste from any direct communication with the drain, the abolition of basement gullies inside the house wherever practicable, the rules governing the construction of cesspools and privies, and not least in importance the necessity of subsoil drains, properly disconnected from soil drains in all building sites where dampness is manifest. The remainder of this section very properly treats of the duties with regard to 'giving notices' incumbent upon intending builders and the relationships generally which exist between them and the sanitary authorities.

The concluding division of the work is occupied by explanations and suggestions as to the foregoing by-laws and regulations, and these were circulated among the ratepayers at Uppingham, in order that they might thoroughly understand what is required of them. They are illustrated by sketches, showing the engineering of the the matter, and these are neither too redundant nor too meagre, but exactly sufficient for the ground which the author intended to cover. We leave this work for the present with our heartiest commendations.

Hints on Drains, Traps, Closets, Sewer-Gas, and Sewage Disposal. By P. HINCKES BIRD, F.R.C.S. Blackpool: *Gazette* Office. 1877.

Dangers to Health in Our Houses. By T. PRIDGIN TEALE, M.A. London: J. and J. Churchill. 1877.

Sewer-Gas and its Effects. Liverpool: J. Dodd. 1877.

Sewage Turned to Profitable Account. By R. Pulling. London: Allen. 1875.

FEW working sanitarians are so well known as Dr. Hinckes Bird, the medical officer of health to the Blackpool, Lytham, and Fleetwood sanitary authorities; and in this work he has compiled very much of what has hitherto been done in the way of practical hygiene by his professional brethren. We should have been pleased to see more from his own pen. Perhaps he considered that for the present a collection of trite and apposite quotations upon the many subjects treated would more effectually serve his purpose. At all events this effect has been admirably achieved, and we do not know a little work of this kind upon which the mental eye of the reader can focus itself more quickly or with greater advantage.

Mr. Teale's work is the reprint of a lecture delivered before the Leeds Philosophical and Literary Society in January of the present year, and illustrates some of the haphazard ways in which glazed pipes are laid for the conveyance of sewage and slops from the house. The diagrams which accompany the letter-press and explanations are strikingly effective, owing to the combination of colours used; that being so, we will forbear from blaming the faults of perspective shown by the draughtsman.

These diagrams will, as Mr. Teale says, serve a most useful purpose, as forcible expressions of the facts intended to be set forth. They relate to a series of sanitary defects which came immediately under his notice as surgeon to the General Infirmary at Leeds, and in many of which illness was concomitant with the defects. Several valuable cases are also cited from informants, and there is a useful page or two of quotations from the Press as to the dangers resulting from imperfectly laid drains, and direct communication of the various household services with such drains. We are extremely pleased with this work, and it should be widely distributed. Mr. Teale has no patent goods to recommend, but simply treats the matter as a philosopher and as a friend.

Mr. Dodd's book belongs to that class of books which is issued with the ostensible purpose of enlightening the public as to the merits of a particular article of merchandise patented by the writer. His patent ventilating water-closet, looking at the pamphlet from this point of view, is well supported, although of course the quotations, chosen for republication by Mr. Dodd, were written without any knowledge of the patent closet. Books of this description can certainly do no harm, but the question arises, Are they really useful? They will often disappoint a student who purchases the books from advertisements, as he naturally expects to see an original work. Were such books accepted by the regular trade publishers, and exposed, for instance, in booksellers' shops or on the railway stalls, such a proceeding would infallibly disgust all original scientific writers, and in the end prove a gigantic nuisance. We make these remarks in no derogatory spirit to the pamphlet before us. The value of even such productions as these is great, and in any collection of sanitary works bound-up brochures of this description form very interesting and instructive volumes. For who ought better to see

the bearings of any invention than the inventor himself? Into the merits of the closet itself, which is advertised on the back, we trust to enter upon an early occasion.

Mr. Pulling's production of fifteen pages is a 'hash' of varied matters connected with sewage and waste lands. We are told that the earth closet system means health and riches, while the water-closet system means disease and waste. We are also told that the 30 millions of people in Great Britain produce annually 2½ million tons of solid excreta, and 12¼ million tons of urine, and that 30 gallons of water per diem per head, or 3,285 million gallons, are required for flushing out the water-closets. The author also says that during the last forty-five years we have cast 90 millions of tons of excreta and 450 millions of tons of urine into our streams and rivulets.

In our opinion this is hardly the way to convince the people that the earth-closet system is the best. The author would do well to examine the other side of the question and see how many times the soil suitable would have to be used over and over again, and how much it would cost a city like London, were the dry system compulsory there. Has he seen Mr. Haywood's statistics? we think not. To say also that we could realise a profit of 29 million sterling yearly with the earth system is preposterous.

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

WANTED A MEDICAL OFFICER OF HEALTH.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Attracted by the proverbial beauty of the Warwickshire woods I was induced to wander, one August evening, from the somewhat obscure town of Southam, along the road in the direction of Coventry; visions of Kenilworth, of Warwick, and Stoneleigh floated through my mind, as I discussed with a friend the advantages of a residence in such a beautiful district, away from the fumes of factories and all the deleterious influences of town life recently pointed out by Mr. Gladstone.

My reflections were, however, brought to a rather abrupt conclusion by a request from my friend that I would accompany him to the neighbouring village of Long-Itchington, which at first sight might have appeared to be 'an abode of health' as well as 'a home of plenty,' but a few inquiries elicited the information that the place was subject to periodical visitations of fever, and other infectious diseases; after a little further scrutiny we were brought to a pool of stagnant water and semi-fluid filth, which from early morn to dewy eve, gave forth its noxious effluvia almost in the centre of the village green; here the neighbouring cottagers have discharged their sewage, and the village children have drowned their dogs and deposited their dead kittens for a period of fifteen years.

I naturally inquired if the inhabitants were destitute of olfactory nerves as well as intellect, when I was informed that repeated applications had been made to the local sanitary authority, but that nothing had been done to abate the nuisance. I suggested an application to the medical officer of health, when I was told that no such official existed, that the 'board declined to appoint one,' preferring to spend the ratepayers' money in treating the fever to the more reasonable remedy of removing the filth. Must the inhabitants suffer in silence, hold their tongues, as well as their noses, or had they better apply to the Secretary of State? A WANDERER.

VITAL STATISTICS.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Dr. E. J. Syson, in his letter in your last issue, again pleads, almost piteously, for reference of the questions on which he declares himself to be still at issue with the Registrar-General to 'some competent but entirely disinterested umpire.' Nothing would please me better than that this question, which I agree with Dr. Syson is of vital importance, should be further discussed and finally settled, if there be anything still to settle.

When, however, Dr. Syson persists in declaring that the views of Dr. Letheby, Dr. Rumsey, and Mr. John Hawksley have only been met by 'sneers and mere assertions,' and by the expression of my 'opinions, wishes, and predilections,' it is only fair to ask permission to state what is the present position of the controversy. Dr. Letheby, of whose talents as an advocate it is impossible to speak too highly, in his remarkable opening address to the Metropolitan Health Officers, at their Association's session of 1874-5, made an uncompromising attack on the Registrar-General's statistical method, and declared all his conclusions to be 'mischievously delusive.' On the same evening that the address was read, Mr. John Hawksley, who attended as the guest of Dr. Letheby, in a long speech which occupied the whole time available for discussion, expressed his opinion, upon which Dr. Syson appears to set much store, that the Registrar-General's conclusions were not worth the paper they were written upon. Two months after Dr. Letheby's address, in which all the charges previously made against the value of the Registrar-General's statistics by Dr. Rumsey, Mr. Andrew Watt, Mr. Sargant (called Dr. Sergeant by Dr. Syson), and others, were adopted and most forcibly stated, I read my paper before the Statistical Society, in which I attempted in the most practical manner to answer Dr. Letheby's attack. That paper makes no 'mere assertions;' it expresses no 'opinions, wishes, or predilections;' it simply states facts and figures, and explains how every result is arrived at. Since that paper was read, in December, 1874, no attempt has been made by any of the 'uncompromising antagonists of the Registrar-General,' mentioned by Dr. Syson, to disprove any of the figures, or the conclusions derived therefrom, embodied in that paper. The elaborate calculations in that paper showed that, in thirty-two populations examined, the normal or life-table rate of mortality is invariably lower, in populations in which a high birth-rate prevails, than in populations in which the birth-rate is low. This is no assertion. I explained how the calculations were made, and any ordinary arithmetician can test both the method and its use. Unless that method can be proved unsound (and if it is unsound, surely Dr. Syson, or some of his friends, can expose its unsoundness), I do assert with the greatest confidence that Dr. Syson's theory of a high birth-rate causing a high death-rate is an exposed and exploded fallacy.

It is really rather late in this controversy for Dr. Syson to notice the 'remarkable fact' that a 'high birth-rate is universally accompanied by a high death-rate.' This appears to have been [the main stumbling block of Dr. Letheby, his predecessors and his followers, and is specially dealt with in my paper, which, if Dr. Syson has read, he confesses his inability to answer or discuss.

Dr. Syson complains that his opponents have shifted their ground since the controversy commenced; that at one time they argued that a high birth-rate proved that the population contained a large proportion of persons living at ages when the rate of mortality was low; and at another that a high birth-rate produced a large proportion of persons living at the low mortality periods. This is no shifting of ground; both causes operate to produce the same result. I have proved that the normal or life-table rate of mortality among populations with high birth-rates is below the average, and also proved that this fact is due to three causes; the excess of children living at ages when the mortality is low, the excess of young adults (which causes the high birth-rate) at ages when the rate of mortality is also low, and the small proportion of elderly people, among whom the rate of mortality is high.

I will pass by Dr. Syson's allusion to my official

position, and his insinuations of unworthy motives in the part I have taken in this controversy. The absurdity of the idea that the Registrar-General or his department can have any interest or object in misrepresenting the true bearing of mortality statistics constitutes a sufficient reply to this part of Dr. Syson's case. I sincerely regret the strong personal tone that Dr. Syson has from the first infused into the discussion, and which was intensified by Dr. Letheby, but I am ready at the same time freely to acknowledge the debt of gratitude I owe them both for having induced me to devote the labour to the subject which the paper I read before the Statistical Society cost me. My official training up to that time had led me to accept without doubt or question, the system of vital statistics constructed by Dr. William Farr. Since this system was so boldly and relentlessly attacked by Dr. Letheby and Dr. Syson, I have thoroughly convinced myself, not only theoretically, but practically, of the true effect of the age-distribution of a population upon its death-rate, which is the real question at issue. I have published my argument and mode of calculation, and simply ask Dr. Syson and his believers, of whom all are silent but himself, to test the calculations for themselves, and if they can, to expose their fallacy.

7 Westbourne Square, London, W. N. A. HUMPHREYS.

Sanitary Invention.

PATENT 'EXCELSIOR' SPRING MATTRESS.

THIS excellent mattress obtained a certificate of merit with special commendation, at the Manchester and Salford Exhibition of Sanitary Appliances.

From personal observation we can testify to the merits of this invention. Various spiral spring mattresses have from time to time been introduced. All of them have, by reason of their peculiar construction, the effect of forming a single depression in the centre when the bed placed upon them is occupied by two people. This cause of discomfort is removed in the spring mattress under notice. Its construction is such as to gain a maximum of strength by the use of a small quantity of material. Strong chains of tinned iron, made in flat links and joined at intervals of about a foot to strong spiral springs, pass from end to end of the mattress.

These springs are connected at each end to transverse chains, serving to keep the whole in place, and forming a strong and perfectly resilient mattress, capable of sustaining four or five times the weight ever likely to be placed upon it, and without protuberances of any kind. A thin, loosely filled horsehair mattress is all that is needed to form a bed remarkable for ease, comfort, and perfect adaptation to the movements of the body—a result obtained by the free and independent movement of the component parts of the metallic mattress. It is perfectly noiseless, affords no harbour for vermin, and admits of thorough disinfection. The 'Excelsior' mattress may be applied to any iron bedstead already in use. Special sizes are made for hospitals, infirmaries, and asylums. Economical in first cost, almost indestructible, and readily repaired if accidentally damaged, they recommend themselves to all interested in large public buildings, and should be used in every case where the perfection of luxury in bedsteads is required. As these mattresses are made in all sizes, they can be used under all conditions and in every climate. Ships' berths, camps, or in fact any place where two points of suspension can be found, are sufficient means of fixing them. In short, there scarcely exists a spot where a luxurious bed need be sought for in vain, if one of these admirable mattresses is at hand. Messrs. Chorlton and Dugdale, 76, Higher Ormond Street, Manchester, are the manufacturers.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

FREEMAN, The Rev. William, has been appointed Chairman of the East Dereham Local Board and Urban Sanitary Authority.

GREEN, Mr. Richard, has been appointed a Member of the Rowley Regis Local Board and Urban Sanitary Authority, Staffordshire, vice Penn, deceased.

JAGGER, Mr. Squire, has been elected a Member of the Northowram Local Board and Urban Sanitary Authority, Yorkshire.

KIRK, Mr. James, has been re-appointed Inspector of Nuisances for the Whittington Urban Sanitary District, Derbyshire.

LAW, Mr. Elston, has been elected a Member of the Sleaford Local Board and Urban Sanitary Authority.

LAWTON, Mr. James, has been appointed Collector to the Whittington Local Board and Urban Sanitary Authority, vice Kirk, resigned.

MACKINTOSH, Angus, M.D. Univ. Glasg., L.F.P.S. Glasg., has been re-appointed Medical Officer of Health for the Dronfield and Whittington Urban Sanitary Districts, Derbyshire.

MORGAN, William, Ph.D., F.C.S., has been appointed Public Analyst for the county of Carmarthen: 15*s.* per analysis, and 2*l.* 12*s.* 6*d.* for each statutory quarterly report.

PARKER, Mr. John, has been re-appointed Surveyor and Inspector of Nuisances to the Corporation and Urban Sanitary Authority of Bridgwater at 200*l.* for one year.

ROSS, Serjeant-Major T. S., has been appointed Inspector of Slaughter Houses, etc., to the Metropolitan Board of Works at 150*l.* per ann.

SPEAR, John, L.R.C.P. Edin., M.R.C.S. Eng., has been re-appointed Medical Officer of Health for the South Shields Urban Sanitary District, for one year.

WALKER, Mr. S. W. S., has been appointed Clerk to the Altofts Local Board and Urban Sanitary Authority, Yorkshire, vice Hicks, resigned: 30*l.* per ann.

WILSON, E. W., Esq., has been appointed Treasurer to the Sunderland Guardians and Rural Sanitary Authority, vice Alder, resigned.

WISEMAN, John Greaves, F.R.C.S. Eng., L.R.C.P. Lond., L.S.A. Lond., has been appointed Certifying Factory Surgeon for the District of Ossett, Yorkshire.

VACANCIES.

BURTON-ON-TRENT RURAL SANITARY DISTRICT. Two Medical Officers of Health: 50*l.* per ann. each for three years. Inspector of Nuisances: 200*l.* per ann. for three years. Applications, 25th instant, to William Coxon, Clerk to the Authority.

CHESTERFIELD. Public Analyst. Application, 24th instant, to John Cutts, Town Clerk.

CHESTERFIELD, CORPORATION OF, AND URBAN SANITARY AUTHORITY. Surveyor.

HUNTINGDON URBAN SANITARY DISTRICT. Medical Officer of Health. Application, 18th instant, to the Town Clerk.

LUDDENDEN-FOOT LOCAL BOARD AND URBAN SANITARY AUTHORITY, Yorkshire. Surveyor.

NEWBOLD AND DUNSTON URBAN SANITARY DISTRICT, Derbyshire. Inspector of Nuisances. Application to J. G. Young, Clerk to the Authority.

RADNORSHIRE. Public Analyst: 21*s.* per analysis and travelling expenses when attending to give evidence. Application to the Clerk of the Peace, Presteign.

WEST HARTLEPOOL URBAN SANITARY DISTRICT. Medical Officer of Health.

WIMBLEDON LOCAL BOARD AND URBAN SANITARY AUTHORITY. Surveyor: 250*l.* per ann. and residence. Application, 21st instant, to W. H. Whitfield, Clerk, 5, Southampton Street, Bloomsbury.

WINSLOW RURAL SANITARY DISTRICT, Buckinghamshire. Medical Officer of Health: 60*l.* per ann. Application, 21st instant, to Thomas P. Willis, Assistant-Clerk to the Authority.

SANITARY PATENTS.

2476. Improvements in the purification of gas, and the utilisation of by-products by the manufacture of secondary products therefrom. Roger William Wallace, Chemical Works, New Road, Battersea Park, Surrey, and Carl Friedrich Claus, Great St. Helen's, London.

2659. Improved apparatus for lighting and extinguishing fires. Charles Rennick, Queen Victoria Street, London. A communication from Eddy Taylor Thomas, New York, U.S.

NOTICE.

THE SANITARY RECORD *is published every Friday morning, and may be ordered direct from the Publishers. Annual Subscription, 17s. 4d.; free by post, 19s. 6d.*

Reading Covers to hold 12 numbers of THE SANITARY RECORD *have been prepared, and may be had direct from the Publishers or through any Bookseller, price 3s.*

Original Paper.

ON THE WATER-SUPPLY OF SEASIDE WATERING-PLACES.

By G. W. WIGNER, F.C.S.

AT the request of the proprietors of the SANITARY RECORD, I have undertaken to examine and report upon the water-supply of all the principal seaside watering-places in England and Wales. There are no towns where the character of the water-supply is of so much importance as in health resorts. People who have spent the entire year in hard work, and very frequently in close homes, go to the seaside to gain health and strength, but if they are met there by impure water, it is scarcely any wonder that illness is sometimes the result of their visit.

The unsatisfactory character of some of the waters which I examined last year, and reported on in papers published in the SANITARY RECORD, was quite sufficient to show that if there had not been counteracting influences of the strongest kind at work in the shape of pure bracing air and entire change and rest, disease must have been produced.

In undertaking a fuller investigation this year, I do so with a sense of the responsibility it involves, and therefore I state first the principles upon which I act in the analyses.

In the first case, I alone am responsible for the samples of water being what they are represented to be. All samples, unless a statement is definitely made to the contrary, have been drawn either by myself or by one of my assistants, and in each case it will be stated whether the sample has been drawn from the main supply of the town or from private wells or otherwise. In some places an additional sample has been received from the local surveyor or some other officer of the town, but the results of the analyses of these samples will always be given independently.

As far as possible, I have endeavoured to obtain information as to the character of the wells or springs from which the supply is drawn, and as to the character of the supply itself, whether it is constant or only intermittent, etc.

As to the mode of analysis, I of course adopt Wanklyn's albuminoid ammonia process, with the addition of one or two estimations which, in my opinion, considerably increase the value of the analysis, and I think it essential in every case to make a microscopical examination of the water, not only in its condition as drawn from the tap, but also of the sediment, if any, and of the residue left by evaporating a few drops on a glass slide. The oxygen absorbed by organic matter is determined by means of a standard solution of permanganate of potash, which is allowed to act on the water for three hours.

The sugar-test which I use and refer to in some of the analyses is that which was described some years ago by Mr. Heisch, and referred to again in *The Analyst* for July, in the present year. According to Mr. Heisch's experiments, which I can, as far as my tests of it have gone fully confirm, the addition of a solution of pure sugar to an impure water contained in a closely-stoppered bottle, causes the growth of a peculiar and well-defined cell, which is never found when drainage matter is absent.

In order to make the papers as consecutive as possible, I shall commence with the towns on the Norfolk coast, and follow regularly round the eastern, southern, and western coasts, concluding with the Yorkshire coast.

On the Norfolk coast, the first town we come to is HUNSTANTON, which is a small place, having a population of about 1,000 in winter, and in summer probably about as many visitors. The water is said to be pumped from a chalk well about fourteen miles from the sea, with a constant supply equal to something like thirteen gallons per head during the visiting season. Plugs and standpipes are provided for fires. The water is not filtered. It is reported that an analysis of it has recently been made at Edinburgh, the result of which showed that there was a good deal of carbonate of lime in the water, which was consequently rather hard, but I cannot ascertain the other details of the analysis. My sample was taken from a main tap, and the results of my analysis are as follows—

	Grains per gallon.
Total solid matter	25·30
Loss on ignition after deducting combined carbonic acid	6·92
Lead and copper—very minute traces.	
Iron—heavy traces.	
Chlorine, calculated as chloride of sodium	3·69
Hardness before boiling, 16° (Clark's scale)	
,, after boiling, 9° ,, ,,	
Nitrogen as ammonia	·0038
,, albuminoid ammonia	·0032
,, nitrites	·0086
Oxygen absorbed by organic matter	·0280

The colour of the water was a dirty opaque yellow, due to a heavy trace of suspended matter, showing the necessity for filtration. The result of the microscopical examination was quite satisfactory, and did not indicate the presence of any animal contamination. The sample was free from objectionable taste or smell. The water supply of Hunstanton may therefore be viewed as fairly satisfactory, and would be quite so if the water were filtered before it is supplied to the town.

WELLS, the next place we come to in passing round the coast, appears to have no public water supply, but only a large number of wells, the water being drawn from them in most cases by pumps, one of which frequently supplies several houses. The wells are all very shallow, some only 6 feet from the surface, and probably few reach as much as 20 feet. At the time of my samples being drawn, one of the largest hotels there was in such a state that the pump belonging to it being broken, the proprietor was compelled to use a neighbour's pump in order to obtain water. I took two samples, one from the pump just mentioned, and another from a pump which supplies three or four houses with water, and the results of my analyses were as follows—

	No. 1. Pump T. Grains per gallon.	No. 2. Pump C. Grains per gallon.
Total solid matter	85·20	49·70
Loss on ignition after deducting combined carbonic acid	13·90	11·54
Lead and copper	none	none
Iron	slight trace	slight trace
Chlorine, calculated as chloride of sodium	17·73	7·37
Hardness before boiling, Pump T, 36°; Pump C, 24° (Clark's scale)		
Hardness after boiling, Pump T, 31°; Pump C, 15° (Clark's scale)		

	No. 1. Pump T. Grains per gallon.	No. 2. Pump C. Grains per gallon.
Nitrogen as ammonia . . .	0·0044	0·0026
,, albuminoid ammonia .	0·0082	0·0036
,, nitrates . . .	2·6152	1·4094
,, nitrites . . .	0·0086	0·0058
Total nitrogen in these four forms .	2·6364	1·4214
Oxygen absorbed by organic matter	·056	0·0384

The first sample, marked T, was pumped from a well said to be under 20 feet deep, which is used by the inhabitants of three or four houses. The colour of the water is a yellowish green, owing to the presence of a large quantity of suspended matter. The microscopical appearance was far from satisfactory, and although no living organisms could be detected, there were quite sufficient remains of organic matter to render it probable that the water had been heavily contaminated at some recent period. The amount of nitrogen as nitrates is excessive, corresponding as it does to rather more than ten grains of combined nitric acid per gallon of water. Although the albuminoid ammonia is not sufficiently high to bring the water into the absolutely dangerous class, yet there is no doubt, viewing all the details of this analysis, that the water must be condemned as totally unfit for domestic use.

The other sample, marked C, was drawn from the pump used by the hotel referred to above. The water was free from suspended matter, and when viewed in a column 2 feet long it had a pale yellow tint. It contains little more than half the solid matter, salt and nitrates, contained in the T sample, and is therefore in every respect a better water. The microscopical appearance of it was also much more satisfactory; there were certain small particles of vegetable tissue present, but no animal matter could be detected, and when treated by the sugar test it did not show the presence of any drainage matter. Although, therefore, the nitrates are high, yet this sample may be passed as fairly satisfactory. Looking at these two analyses, however, together, it is impossible to view the matter and not consider it eminently unsatisfactory that a town with a population of 3,000, and during the visiting season nearly double that number, should be supplied only from shallow wells, and that the wells should differ so much in character as those from which the above two samples were taken. It is quite time that the authorities bestirred themselves, and endeavoured to furnish a better and constant supply to the town.

YARMOUTH.—Passing on again, we come to this town, which is partially supplied with water by a company, and it appears that by a by-law all new houses are compelled to have this water laid on; but notwithstanding this a large number of the inhabitants of the older houses seem to prefer well or pump water. The company print on their receipt-forms three analyses by Dr. Letheby, dated July, 1868, of the company's water, of water from Dere Well pump, and the church pump. The analyses are as follows—

	Company's water.	Dere well	Church pump.
Carbonate of lime and magnesia	9·15	23·60	21·65
Sulphate of lime and magnesia	2·03	20·34	17·43
Alkaline chlorides . . .	7·44	30·00	12·41
,, nitrates . . .	0·00	8·80	3·03
Silica and alumina . . .	0·81	1·04	0·64
Organic matter . . .	1·53	1·86	1·59
	20·96	85·64	56·75

The results of my analysis of the company's water drawn from the main are as follows—

	Grains per gallon.
Total solid matter	31·10
Loss on ignition after deducting combined carbonic acid	12·13
Lead and copper—none.	
Iron—slight trace.	
Chlorine, calculated as chloride of sodium .	7·37
Hardness before boiling, 13°3 (Clark's scale)	
,, after boiling, 8°6 ,, ,,	
Nitrogen as ammonia	0·0046
,, albuminoid ammonia . .	0·0166
,, nitrates	0·1472
,, nitrites	0·0079
Total nitrogen in these four forms . .	0·1763
Oxygen absorbed by organic matter from a standard solution of permanganate of potash	0·1440

These results, as will be seen, differ very greatly from Dr. Letheby's in 1868, and it is scarcely necessary to point out that this in itself is a bad sign, as there is no water so dangerous for domestic use as a variable one. The amount of total solid matter has increased by 50 per cent., and the hardness, although not specifically stated by Dr. Letheby, must evidently have increased by some six degrees. While assuming, as I think I may rightly do, that the 'organic matter' referred to by Dr. Letheby has been calculated by the multiplication by eight of the oxygen absorbed, there is very little change. The nitrates are fairly low, but the albuminoid ammonia is so high as to bring the water within the dangerous class. The water also contained traces of suspended matter, which gave it a dirty yellow colour. The microscopical appearance was very unsatisfactory, several small fragments of hairs and cellular tissue being distinctly visible, which results are entirely confirmatory of the opinion which would be formed from the mere consideration of the albuminoid ammonia alone. The water is said to be derived from an inland lake seven miles from the town, and to be supplied under constant pressure to all parts of it, and in the report made to me the town surveyor says the water is filtered; if so the filtration must be inefficient.

A sample of water from a pump, said to be the Dere Well pump, entirely differs from the sample upon which Dr. Letheby reported in 1868. My analysis of it is as follows—

	Grains per gallon.
Total solid matter	112·10
Loss on ignition after deducting combined carbonic acid	18·82
Lead and copper—none.	
Iron—trace.	
Chlorine, calculated as chloride of sodium .	41·07
Hardness before boiling, 34° (Clark's scale)	
,, after boiling, 33°6 ,, ,,	
Nitrogen as ammonia	0·0875
,, albuminoid ammonia . .	0·0119
,, nitrates	4·1978
,, nitrites	0·0089
Total nitrogen in these four forms . .	4·2461
Oxygen absorbed by organic matter from a standard solution of permanganate of potash	0·0980

It will be seen, therefore, that the present sample contains much more solid matter, chlorides and nitrates, than Dr. Letheby's sample. The colour of the water, when examined in a tube 2 feet long, was of a pale urine yellow; it had an offensive smell and

taste, and contained heavy traces of suspended matter. The microscopical examination of this water was also unsatisfactory, showing the presence of a large number of crystals of urate of ammonia and urate of soda, together with well-defined pieces of animal tissue of different kinds. This water is evidently quite unfit for domestic use, and it is the duty of the local authority at once *to close* such a dangerous pump, the water from which may practically be called sewage. If what I hear is correct, there are one or two other pumps in the neighbourhood of this one which probably deserve to be classed in the same category.

A sample which I obtained from the Church pump, gave the following results—

	Grains per gallon.
Total solid matter	75·60
Loss on ignition after deducting combined carbonic acid	17·30
Lead and copper—trace.	
Iron—heavy trace.	
Chlorine	15·91
Hardness before boiling, 30°·6 (Clark's scale)	
Hardness after boiling, 29° (Clark's scale)	
Nitrogen as ammonia	0·0012
,, albuminoid ammonia	0·0108
,, nitrates	1·3491
,, nitrites	0·0079
Total nitrogen in these four forms	1·3690
Oxygen absorbed by organic matter from a standard solution of permanganate of potash	0·1260

The colour of this sample was a strong urine yellow, and when warmed it had a most offensive smell and taste. It also contained traces of suspended matter. The results of the microscopical examination were as bad as they could be, the sedimentary matter being full of animal fibre, and containing also living organisms, and although the albuminoid ammonia and the nitrogen as nitrates are somewhat lower than in the Dere Well sample, it is impossible to do anything but condemn this sample as decidedly as that was condemned, and the sooner the corporation of Yarmouth take the matter into their own hands, and shut up these pumps—to say nothing of compelling the water company to improve the condition of their water—the better it will be for the sanitary condition of a town which, with 40,000 inhabitants, and in summer nearly half that number of visitors, certainly ought to be able to obtain a constant supply of good water.

LOWESTOFT.—This town is supplied by a company, who own the gas and waterworks. They have declined to give me any information with reference to the supply itself, or to let me have a sample of it for analysis, but they have furnished me with a copy of an analysis made in July, 1876, by Dr. Tidy, whose results showed—

	Grains per gallon.
Total solid matter	16·46
Chloride of sodium	5·32
Hardness before boiling, 8° (Clark's scale)	
,, after boiling, 1·6°	
Nitrogen as ammonia	·0040
,, albuminoid ammonia	·0080
,, nitrates	·225
Oxygen absorbed	·080

Dr. Tidy states that this water is in every respect a most excellent water, and leaves nothing to be desired either as regards good quality or efficient filtration.

I obtained a sample from one of the main taps in the town, and my results are not quite so satisfactory as Dr. Tidy's. I find that the water does contain traces of suspended matter, and when viewed in a 2 foot tube has a pale yellow colour, and I therefore conclude that there is room for improvement in the filtration of the water as actually supplied. The following is my analysis—

	Grains per gallon.
Total solid matter	20·3
Loss on ignition after deducting combined carbonic acid	5·83
Lead and copper—very minute traces.	
Iron—traces.	
Chlorine calculated as chloride of sodium	6·08
Hardness before boiling, 9·6° (Clark's scale)	
,, after boiling, 6·5° ,, ,,	
Nitrogen as ammonia	0·0021
,, albuminoid ammonia	0·0099
,, nitrates	0·3302
,, nitrites	0·0094
Total nitrogen in these four forms	0·3516
Oxygen absorbed by organic matter from a standard solution of permanganate of potash	0·600

The sample was free from objectionable smell or taste, and the result of the microscopical examination was satisfactory. I cannot go so far as to say that the water as supplied at this date 'leaves nothing to be desired,' but still it is a fair drinking water, and though not a first class one no complaint can justly be made with reference to it.

Some of the houses in Lowestoft, and especially some of the hotels, are supplied by private pumps, and a sample from one of these pumps at an hotel gave the following results—

	Grains per gallon.
Total solid matter	141·80
Loss on ignition after deducting combined carbonic acid	28·50
Lead and copper—none.	
Iron—heavy traces.	
Chlorine calculated as chloride of sodium	59·67
Hardness before boiling, 52° (Clark's scale)	
,, after boiling, 42° ,, ,,	
Nitrogen as ammonia	0·0291
,, albuminoid ammonia	0·0158
,, nitrates	5·4604
,, nitrites	0·0064
Total nitrogen in these four forms	5·5117
Oxygen absorbed by organic matter from a standard solution of permanganate of potash	0·1200

This water when examined in a 2 foot tube was of a dark urine yellow colour, almost opaque, and had an offensive saline taste. The residue left on evaporation of a portion of it fused on ignition. The microscopical examination showed that it was full of urine salts with a large number of particles of epithelial matter of different kinds, many crystals of urate of potash being visible. When tested by the addition of sugar the peculiar growth of cells indicating the presence of drainage matter was strongly marked. This water is, therefore, as bad as it is possible for a drinking water to be, and this is another case in which the local authority ought to interfere at once and close the well.

(*To be continued.*)

THE
SANITARY RECORD.
FRIDAY, AUGUST 24, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

THE TAUNTON RURAL SANITARY AUTHORITY AND ITS MEDICAL OFFICER OF HEALTH.

IN a recent number of this Journal we took occasion to call the attention of our readers to the vacillating conduct of the Local Government Board in dealing with the mode of appointment of medical officer of health, and we felt it our duty to animadvert severely, not only upon the prejudicial effect which the deplorable want of policy and of common consistency by the board was producing upon the sanitary service of the country, but also on the great personal injustice of which the board was guilty in having been accessory to tempting gentlemen in various parts of the country to give up their practice, or to resign appointments which they may have held, in order to devote themselves to the public health service, and in then leaving them to the tender mercies of sanitary authorities who had passed from the warm fit of unwonted liberality into which the board had succeeded in stimulating them into the chill reaction of niggardly economy, which is so much more congenial to their nature. We scarcely expected to be so soon presented with so apposite an illustration of the justifiability of our strictures as that which is offered to us by reports in the *Western News* of some recent proceedings of the rural sanitary authority of Taunton in regard to the re-appointment of their medical officer of health. It is, perhaps, an illustration of a somewhat more extreme character than any which has hitherto come before us of the chill penury which too often freezes the current of the rural soul, but it is none the less a striking and instructive proof of the mischievous effects which the molluscous policy of the Local Government Board is calculated to produce, and we shall therefore take the liberty of placing the facts of the case at some little length before our readers.

In the early part of the year 1873, an advertisement appeared in the public papers requiring a medical officer of health for the rural and urban districts of Taunton. The gentleman to be appointed was to devote the whole of his time to the duties of his office, and it was stated that the appointment would be subject to the approval of the Local Government Board, and that it would be '*in the first instance*' (the italics are our own) 'for a period of five years.' Between forty and fifty applicants appeared, and the appointment was ultimately conferred upon Dr. H. J. Alford, a gentleman in every way fitted for it by his previous training, and who has, by general consent, discharged its duties creditably to himself and satisfactorily to the board by whom he was appointed. Under the by no means unnatural impression that the limitation of the appointment to five years was intended not as any indication that it was to be of a temporary nature, but simply in conformity with the terms of the Public Health Act of 1872, which imposed that limit upon all such appointments, Dr. Alford resigned, not only the surgeoncy of the Taunton and Somerset Hospital, but, what was still more valuable to him, the share of the old-established practice which he had carried on with his father, and prepared to devote himself energetically to the sanitary supervision of his district, which is coterminous with that of the Taunton Union, at a salary of 600*l.* per annum, of which the rural authority appears, from a pathetic remark made by one of its members, to have paid 'the lion's share' of 400*l.*, though enjoying only the 'lamb's voice' in the management of the district.

Now, it is not out of place to inquire parenthetically at this stage of the story whether the Local Government did a very wise thing in thus encouraging the guardians of what is practically a single and by no means an excessively large union to thus weight itself with a salary which it must be admitted is very large in comparison either with what the union is paying to its other officers, or with what other unions of similar size are paying to their medical officers of health. Nor does this inquiry appear less called for when we are informed that even at the time when the appointment was made the salary thus paid to Dr. Alford was considerably in excess of that paid to the medical officers of health of neighbouring unions, whose guardians had not allowed themselves to be inveigled into the precipitate liberality into which Mr. Woodhouse, the local government inspector of the district, succeeded in beguiling Taunton. 'For,' as was precisely asserted by one of the members of the rural authority, 'it was owing to what he (Mr. Woodhouse) stated that the salary was fixed so high; and yet what did he do afterwards at other unions? He told them that they must appoint an independent man as medical officer, but that they must not do as they did at Taunton;' an assertion which, if true, places in a still stronger light the bungling and inconsistent way in which these appointments were made. Under these circumstances, when the end of Dr. Alford's term of five years is approaching, and when the more economically disposed members of the rural authority have discovered not only that they are paying, as they think, a disproportionate share of his salary, but that their more astute neighbours who originally effected more thrifty bargains with

their sanitary officials have succeeded in still further cutting down their emoluments, we must confess that we are not much surprised to find that a certain number of the guardians of the Taunton Rural Board have resolved to follow so good an example, and even to better it by summarily severing their combination into the Taunton Urban Board, and by reducing their remuneration to their medical officer of health from 400*l.* to 100*l.* per annum. It is true that they offer the compensation of allowing him to engage in practice if he likes; indeed, they express their willingness to facilitate his obtaining as many independent retainers of a similar kind to their own from the neighbouring unions as he can persuade into employing him, the gentleman who is most active in advocating this alteration in the nature of the appointment generously remarking that Dr. Alford 'might supervise half of England for all he (the speaker) cared!'

Such, then, is the position in which Dr. Alford is now placed by the Taunton Rural Board. He is offered the opportunity of commencing professional life again, with the retaining fee of 100*l.* a year, which, for all he or anyone else can tell to the contrary, may be cut down again to 50*l.*, or even to less, if the guardians should hereafter take it into their heads to do so. It requires no very high strained sense of honour to appreciate the injustice, nay, the cruelty of such a course as this towards a man who has cut himself and those who are dependent upon him adrift from the anchor by which he had formerly tethered himself, and who may in all probability find it impossible to lay hold of it again. This is an aspect of the question on which it is scarcely needful for us to dwell, as its consideration can be more effectively enforced upon the guardians of the Taunton Union by the public opinion of the locality itself than by anything we can say; suffice it to observe, that the moral of the story will be obvious to all who may have felt disposed to devote themselves to the Public Health service, though it is a moral which, we are bound to add, abundant experience of the natural proclivities of boards of guardians scarcely required the weight of new facts to enforce. What we are more disposed to invite attention to is the part which the Local Government Board has played in the matter. Will it be believed that after thus making themselves responsible, through the advice of their inspector, for the appointment of Dr. Alford, and for the creation of the Taunton combined district, on the terms which they themselves originally advised, when they are now appealed to by the rural board, as appears has been the case, to inform them 'which of the various systems of medical sanitary superintendence in rural districts is considered to have sufficiently answered its purpose with least cost to the ratepayers,' they reply, 'that with their present experience of the working of the Public Health Acts, and having regard to the varied circumstances of localities, they do not feel justified in recommending any particular form of combination for the joint appointment of a medical officer of health'? The communication then proceeds with singular inconsistency to say that 'the board may, however, state generally that in their opinion the joint appointment of a medical officer of health for all the sanitary districts comprised within the area of a poor law union is a desirable form of combination;' and add, that 'they approve of the existing combination between the Taunton urban and rural districts, and recommend that the sanitary authorities should arrange for a continuance of it.' It is not surprising that the economical section of the rural board should have treated this feeble and scarcely intelligible utterance of the Local Government Board with the contempt which it deserves, and have informed the functionaries at Whitehall who concocted it, that 'they have agreed to offer the sum of 100*l.* per annum as salary for a medical officer of health, and that the Local Government Board be requested to inform this board if they will pay one moiety of this sum.' We shall wait with some curiosity to see what reply the Local Government Board will make to this modest request. It will be interesting to see whether the board, after starting the Taunton combined district on the somewhat liberal salary of 600*l.* a year, now meekly accepts the depreciatory bid of 100*l.* for the services of Dr. Alford which is offered by the rural authority in the spirit of the accommodating chapmen, who, after offering an article at 5*s.*, knock it down eventually for 6*d.*; or whether they will muster up courage to do what is obviously their duty both to the Taunton authorities and to Dr. Alford to do, viz., to form under the compulsory powers which they possess a combined district sufficiently large for Dr. Alford's efficient supervision, and to enable the sanitary authorities included in it to pay him properly for his services without feeling that they are called on to pay more than is reasonable or than their immediate neighbours pay.

Notes of the Week.

THE St. Austell Sanitary Authority have invited tenders for the cleansing of the street, and clearing the reservoir, etc., at Mevagissey, and for the providing and laying of sewer pipes, construction of street gulleys, and other works of a similar character at Fowey.

PROFESSOR WANKLYN has just been elected to the Chair of Chemistry of St. George's Hospital, vacated by the death of Dr. Noad, F.R.S., who had filled the post for thirty years. Professor Wanklyn will deliver a course of lectures on Physics and Chemistry during the ensuing session.

THE London correspondent of the *Scotsman* states that small-pox recently broke out in the house of Miss Nightingale, but her thorough acquaintance with sanitary matters enabled her to prevent the spread of the disease, which was, therefore, actually confined to the person originally attacked.

WE see with pleasure that to 'Boyle's Patent Self-Acting Air-pump Ventilators' was awarded the highest prize at the Manchester and Salford Sanitary Association's International Exhibition of Sanitary Appliances at present being held at Owens College, Manchester, in conjunction with the annual conference of the British Medical Association. This is the more complimentary to the admirable invention of the Messrs. Boyle, as all the best-known ventilators and systems of ventilation were on exhibition, and the air-pump ventilators were pronounced by the judges—who consisted of a number of the most eminent scientific and practical men in the kingdom—to be the best and most efficient that are at present known.

THE SIMON TESTIMONIAL FUND.

IN accordance with a resolution adopted at a recent meeting of the committee of the Simon Testimonial Fund, it is determined that the funds subscribed shall be spent in a bust of that gentleman, which will be placed in the hall of the Royal College of Surgeons. Mr. Lowe, who presided at the meeting above referred to, remarked that there were no more valuable contributions to medical literature than the reports Mr. Simon had sent out to lighten the work of the medical profession. At the present moment he believed the value of those reports was underrated, but at some future period they would be properly estimated, and the nature and value of his services more publicly recognised. It has been arranged that a small copy of the statue shall be presented to each subscriber of two guineas and upwards. Donations will be received by the honorary secretary at 1 Adam Street, Adelphi; or at the bank of Messrs. Robarts, Lubbock, and Co., Lombard Street.

DIPHTHERIA IN BROMLEY.

DR. BAYLIS has written to say that our remark in the notice on this subject which appeared in the SANITARY RECORD for August 10, respecting the insufficient disinfection of the premises in which the disease occurred, was made in error, as he stated in his report that the nurse had proved of great service in 'isolating the cases and insuring thorough disinfection of the sick room, and of everything going out of or connected with them.' We desire to say that we understood this paragraph to mean that the nurse had disinfected the rooms whilst the patients were in them, which is no disinfection at all. The disinfection to which we alluded as not having been mentioned was the burning of sulphur in the empty rooms and subsequent stripping off of the paper, washing the walls with a strong solution of carbolic acid (containing 2 per cent. of real acid), and repapering them. If these things were done under the supervision and direction of the nurse, we admit that we have been in error; but in that case the precise kind of disinfection should have been stated.

ASSOCIATION OF SANITARY INSPECTORS.

A MEETING of the Association of Sanitary Inspectors was held at the Guildhall, Northampton, on August 18. It was decided that the society should be called the 'National Association of Sanitary Inspectors.' It was proposed to invite Earl Spencer to become the president, but there was so evident a feeling expressed to limit his lordship's powers, functions, and prerogatives, that in all probability, if invited, his lordship will decline the barren honour.

The rules of the association were settled, and, on receipt of a copy, we shall be glad to give them publicity, as we are of opinion that such an association is needed, and calculated to raise the status of inspectors of nuisances as well as to promote public health.

At the meeting at Northampton, Mr. Barnes Austin read a paper on Sewer Gas, and we are glad to see that in the discussion which followed two eminent members of local sanitary associations took interested and intelligent part.

SEASIDE LODGINGS.

UNDER the above heading a correspondent writes to a contemporary that he thinks some 'local boards seem to believe the outgoing tide takes away the sewage, but that the incoming tide is prevented by one or two badly-built traps from forcing the sewer gas back into the houses.' He was told at Torquay that the local board there insists on a 3-inch pipe being attached to the soil pipe in every new house now being built, and leading through the roof, and asks why should not this be made compulsory in every lodging-house. It is a pity, he adds, that proprietors of these houses do not see the advantage of being able to add to their advertisements, 'drains and soil-pipes ventilated.'

This is coming to the exact point, and hitting the quintain with proper intent. We mean the idea of advertising the due attention which has been paid to the sanitary condition of the house. We would also strongly recommend that an analysis of the drinking water—if the supply be from a well—should be added, for on more than one occasion we have known a member of a family return to town worse than when he or she went away, and all owing to the impure supply of water. We should not like to see the days of George Robins return altogether, but an advertisement which guarantees pure air and pure water, and gives professional references, will be a long stride in the proper direction, and perhaps induce the more or less public authorities to follow suit when seeking patronage for their churches, concert-rooms, theatres, and lecture-halls.

A WESTMINSTER SEWER GRATING.

A RESIDENT in Parliament Street, who is most likely to be able to speak truthfully upon the subject, complains that sewer-gas for the last six months has been exuding from the sewer grating at the western extreme corner of the Old Palace Yard gates, which hundreds of members pass over and by every day and night. His attention was on Saturday arrested to it by being nearly suffocated by the emitted sewer gas. He spoke to the constable about it, who has been on duty there since February last, and he told the plaintive story that he had reported the fact for months, that at times he had been quite ill from it, and that he believed thousands of feet of coal gas mingled with sewer gas escaped weekly. The writer then goes on to ask whether this positively poisonous atmosphere might not be wafted into the Houses of Parliament? We quite agree with Mr. Shelley, that there is a possibility of such a thing, and that the sooner the formation of foul air is prevented in the sewer the better for the inhabitants and visitors of that historical district, and for our national reputation as a sanitary people. We have often proclaimed the foul state of Berlin, before it was remedied, and should not put it in the power of the *Berliner Wespe* to shake the pen at us in return.

STATE OF THE METROPOLITAN WATER-SUPPLY.

DR. FRANKLAND reports as the result of his analysis of the waters supplied to the metropolis and some of its suburbs during July, that taking unity to represent the average amount of organic impurity in a given volume of the Kent Company's water during the last nine years, the proportional amount of such impurity in an equal volume of water supplied by each of the other companies, and by the Tottenham Local Board, was:—Tottenham, 0·2; Kent (Shortlands Wells), 0·3; East London, 0·7; Kent (Deptford Wells), 0·8; Colne Valley, 1·0; West Middlesex, 1·2; New River, 1·3; Southwark, 1·5; Chelsea, 1·9; Grand Junction, 2·2; and Lambeth, 2·3. The waters drawn from the rivers Thames and Lea contained a remarkably small proportion of organic impurity, and were efficiently filtered before delivery, the Lambeth Company's water alone excepted, which was 'slightly turbid when drawn from the main.' The waters supplied by the Kent

and Colne Valley companies and by the Tottenham Local Board were of most excellent quality; this deep-well water is of unsurpassed purity, and is very abundant in the Thames basin, but it is as yet supplied to but a very small portion of the metropolis. Dr. Hill reports that the quality of the water supplied to Birmingham had improved in all respects, and was, with the exception of a few suspended particles, clear. The water supplied to Glasgow from Loch Katrine is reported by Dr. Mills as 'out of condition during most of the preceding month, being of a very pale brown colour, containing plenty of muddy particles, with a few fibres, and considerable traces of iron.'

MODEL BY-LAWS OF THE LOCAL GOVERNMENT BOARD AND COMMON LODGING-HOUSES.

A SET of by-laws has just been issued by the Local Government Board for the use of extra-metropolitan sanitary authorities, as regards the common lodging-houses situated in their districts. The by-laws, which are twenty-five in number, are prefaced by a memorandum in which the law relating to these houses is given, and the various sections bearing upon it, as well as the opinion of the law officers of the crown as to the meaning of the words 'common lodging-houses' are fully set out. The latter words are considered not to extend to hotels, inns, public-houses, or to lodgings let to the upper and middle classes, but to include houses in which lodgers are promiscuously brought together, whether the rooms be let by the night or for a longer period. The memorandum further states that the house should not only be wholesome, but should possess further arrangements to fit it for its special purpose, by having dry foundations, proper paving and drainage, the latter, except the water-closet, not being in direct communication with the sewer, and by having the cistern for the water-supply so placed as to prevent the water from becoming fouled. The inside walls are not to be papered, proper means of ventilating the rooms and passages are to be provided, and the number of inmates to be limited, so that every person shall have 300 cubic feet of air in the room occupied, two children under ten years being counted as one adult. Forms of notices are provided for service on the person letting the lodgings defining the number of occupants for each room. The by-laws also provide for the sleeping of the two sexes in different rooms, except as regards married couples, who may occupy beds in the same room if separated by a solid partition; for the cleanliness of the rooms, passages, areas, and yards and water-closets, as well as of the beds and bedding used by the lodgers; and for the daily removal of all solid or liquid filth and refuse from the room. In the event of a case of infectious disease occurring in the house, the keeper is to inform the medical officer of health, and not to allow any person except a relative or nurse to occupy the room, and generally to take efficient measures for preventing the spread of the disease. A male above ten years is to occupy a separate bed, and the notice relating to the number to occupy each room is to be suspended in a conspicuous place in the room. Any offence against these by-laws is to subject the keeper to a penalty. There are also many other regulations to which we need not specially refer.

It is evident that considerable care has been bestowed on these by-laws, but they extend only to houses or rooms which are let off furnished with beds, bedding, etc., although the definition of the words 'common lodging-houses' might be held to include lodgings let unfurnished, where there are several apartments so let in one house. If this be not the case, the power previously conferred on sanitary authorities by the 35th section of the Sanitary Act are considerably reduced in the Public Health Act by the insertion of the word 'common' before 'lodging-houses.' That under the provisions of the Sanitary Act the metropolitan sanitary authorities have power to regulate houses let as unfurnished lodgings there is no doubt, although the power is, except in a few districts, but little used, and if the extra-metropolitan authorities have not that power, it is to be regretted they have been deprived of it. The suggested by-laws are good, and if adopted and efficiently carried out would materially tend to prevent immorality and much unnecessary disease.

THE MANSIONS AT STORY'S GATE.

A CORRESPONDENT writes to the *Building News* respecting these new houses. He says: 'It is impossible to regard this wonderful pile of brickwork without grave considerations anent the Building Act and its operations, and in the interests of the public I beg to make a few remarks. I should like to know whether complete plans of these buildings were laid before the district surveyor, whether he took counsel in such an exceptional case, and whether the work has been carried out according to his instructions, and under his supervision. This, sir, is important not only as regards the work done, but because I hear it is the intention of the proprietor to do much more of the like description. The Building Act requires that "separate sets of chambers tenanted by different persons be deemed to be separate buildings, and be divided accordingly, so far as they adjoin vertically by party walls, and so far as they adjoin horizontally by party arches or fireproof floors.' The more recently erected portion of these buildings has, agreeably with the rule quoted, fireproof floors, but the first block of building, I believe, has not such. Why not? Simply, I suppose, because the proprietor did not see the necessity of it. Though the intention of the Building Act is plain, yet here are huge blocks of dwellings, part of which are fireproof, part not, and can anyone look up at these monstrous structures, and consider the number of lives jeopardised in case of fire, and say there is not as much reason for fireproofing in one case as in the other? A grave responsibility rests somewhere. If the proprietor o such intended structure does not choose to declare the purpose of the building, I do not see that there is any way, so far as provision in the Building Act is concerned, of obliging him to use fireproof construction, but there ought to be. If the district surveyor, in this instance, knew the purpose of the structure, why are the terms of the Building Act not adhered to? As regards thickness of walls, the Act would require in these buildings "two stories 21½ in., three stories 17½ in., remainder 13 in."—the thickness of a cross wall being two-thirds of the foregoing. By a gross oversight, no distinction is made in thickness of walls between a fireproof building and others, yet the weight on the walls in the one case is immensely increased. Such dimensions as I have quoted in such a building as I am now noticing, with brick or concrete floors, are simply absurd. Consider, sir, the weight of twelve solid floors in a building over a hundred feet high, being borne by 13 in. walls in basement; and consider, too, what brickwork often is! Yet this is the Building Act. They ought to be twice the thickness. Of course, it may be said that it is the duty of the surveyor, when occasion requires, to oblige builders to increase the thickness. But does he, and should it be left to him? It appears to me there should be separate tables for fire-proof buildings in the Act—as little left to the surveyor as possible; and as, even without fireproof floors, the thickness of walls named is not sufficient for buildings of this height, extra provision should be made accordingly. In the first erected block of these buildings two or three of the top floors have no front wall. This I consider a gross infringement of the Building Act, which requires, "brick, stone, or other incombustible substances." Of course, it will be said that these floors are in the roof; but, in fact, they are not. If I wanted to build a three-story house, and should seek to erect from ground level a front thereto of wood covered with slate, just a shade out of the perpendicular so as to "cheat the devil," I should be stopped, and told the Act did not allow it. But if my

proceedings are bad at ground level, would they be less so if these stories are lifted a hundred feet in the air, being called a roof?'

Special Reports.

EXHIBITION OF SANITARY APPLIANCES.

WE have already noticed briefly, the exhibition of sanitary appliances at Manchester which was held in a temporary wooden building erected for the purpose in the grounds of Owens College. A space inadequate to their requirements was placed at the disposal of the Manchester and Salford Sanitary Association, but a better arrangement of the stands and a little more energy on the part of some of the officials would have been conducive to the comfort and convenience of both exhibitors and visitors, and would have prevented some of the diagrams and drawings from getting damaged by rain which poured through the roof. On the whole, however, we congratulate the Association upon having obtained an interesting collection of sanitary appliances, and we hope to see kindred associations holding exhibitions in other parts of the country, feeling sure that not only are such exhibitions most useful to those who have to administer the sanitary laws, but that they promote a healthy competition amongst inventors, and also greatly assist in the general diffusion of sanitary knowledge. A few years since, such a display would in the first place have been most difficult to organise, and secondly would have obtained but few visitors. It is evident, however, that there is at last a public awakening to the importance of sanitary science in all its branches. We would particularly call the attention of exhibitors to the desirability of having well-informed and intelligent representatives to explain their inventions and answer enquiries. The awards of the judge were made on Thursday last; they take the form of certificates of merit, and are as follows:—

Section 1. Drainage and disposal of refuse. Messrs. B. B. Haresceugh and Co., Leeds, patent spring lid receptacle. Messrs. F. Hancock and Co., Dudley, household cinder sifter. Moule's Patent Earth Closet Company, Limited, earth closet apparatus; the apparatus with movable pan specially commended. Mr. D. Clark, Carlisle, patent stench traps and manhole cover. Mr. John Borwell, Burton-on-Trent, Halberd's patent gully and stench trap. Mr. John Dodd, Liverpool, patent ventilated closet. The Sanitary and Economic Manure Company, Limited, Salford, Morell's patent self-acting cinder sifting ash closet. Messrs. Potts and Company, Birmingham, Edinburgh air-chambered sewer trap. Messrs. Maulove, Alliott and Co., Nottingham, Fryer's disinfecting apparatus and system of treating mineral refuse, etc. Messrs. E. J. Hughes and Son, Manchester, closets and cinder sifter. Mr. R. Goodwin, Chesterfield, stench trap. Carbon Fertiliser Company, London, closets, pans, etc.

Section 2. Sanitary architecture and building, Liverpool. Silicate Paint Company, paints. Mr. G. A. Marsden, Liverpool, new mode of building. Boulinikon Floorcloth Manufactory Company, Salford, floorcloths.

Section 3. Water-supply, ventilation, disinfection, heating, and lighting. Mr. C. E. H. Rogers, Retford, portable disinfecting chest, specially commended. Mr. P. Hinckes Bird, Lytham, plan of costless ventilation. The Silicated Carbon Filter Company, London, filters. Messrs. Thomas and Taylor, Manchester, portable fireproof disinfecting and clothes drying closet, with ironer's stove combined, specially commended for its simplicity; also for self-acting disinfecting washing and wringing machine combined. Messrs. Anderson and Wright, Manchester, vertical ventilating tubes, with water-boxes and dust-screens; also for an aerating filter, the latter specially commended for the method of aeration and its adaptability for cleaning. Mr. H. Fletcher, Manchester, model of cottage fireplace for economising fuel. Mr. T. Lloyd, Winchester, exhaust ventilator and railway carriage ventilator. Messrs. Joseph Halliday and Co. (Limited), Manchester, filters. Dr. F. T. Bond, Gloucester, floating syphon and floating feed regulating filters. Mr. Joseph Blackmore, Manchester, earthenware cistern, specially commended. The Coalbrook Dale Company, Salop, grates. The Spongy Iron Water Purifying Company, London, Bischof's filters. Lancashire Ventilating Company, Manchester, Tobin's patent tubes. Mr. George F. Cox, Manchester, Abyssinian tube wells. Messrs. T. Bradford and Co., Manchester, drying closets and disinfecting stove and vowel-washing machines for hospitals etc. Messrs. R. Boyle and Son, Glasgow, self-acting air-pump ventilators. Messrs. Elliott, Alston and Olney, Manchester, Branland's quadrants. Messrs. Shilleto and Shorland, Manchester, grate. Messrs. Winder and Harrop, Manchester, pure block tin tubes.

Section 4. Smoke consuming apparatus. Messrs. Johnson and Hobbs, Manchester, apparatus for condensing and purifying smoke. Mr. J. K. Broadbent, Cheetham, automatic side firing apparatus and ventilating furnace door, with self-acting meter. The Chadderton Ironworks Company Limited, McDougall's patent mechanical stoker. The Patent Diagonal Racking Fire Bar Company, London, smoke preventing bars.

Section 5. Food, clothing, and personal conveniences. Messrs. F. Hancock and Co., Dudley, butter cooler, mixing machine, &c. Messrs. Chorlton and Dugdale, Manchester, hospital beds and spring mattresses. Messrs. E. Firth and Co., Manchester, Major Orell's knapsack. Messrs. Jewsbury and Brown, Manchester, mineral waters. Messrs. W. Cook and Co., Manchester, toughened glass feeding-bottle. Hooker's Cream Milk Company, London, specially commended. Messrs. Goundry and Co., London, compressed tea and coffee, commended for portability.

Section 6. Disposal of the dead. Messrs. S. Hatchard and Co., duplex funeral car.

Section 7. Sanitary literature. Ladies' Sanitary Association, London.

No awards were made for disinfectants, time not permitting the judges to make analyses. As regards the awards we will only remark that if the judges have erred at all, it is on the side of liberality.

We cannot afford space to consider in detail all the exhibits, and many of them are so well known to our readers as to render comment superfluous.

Section I. Drainage and disposal of refuse.

Among all sanitary questions, that of the disposal of refuse is engaging most attention at the present time, and although many ingenious schemes have been devised, the subject is yet in its infancy, and some of the most recent and apparently most effective means require time to test their efficiency and economy. We can only from time to time call attention to the different schemes that come under our notice, and record the results of our own observations and the experience of those that have tried them. One of the principal sanitary reforms of recent years is the abolition of cesspools in towns, and in many places the 'pail system' has met with much favour; by this system we understand an arrangement for collecting excreta in receptacles that are removed once a week, or oftener, by the local authority. When this system was first introduced, a nuisance arose from the effluvia emitted by the collecting vans as they passed through the streets. Messrs. Haresceugh, Leeds, exhibit their 'patent spring-lid receptacle;' the lid has a cushion of indiarubber affixed, and is easily fastened down by a powerful spring; the vessel is thus rendered air-tight, and the possibility of nuisance precluded. As the lids are brought with the empty pails, and the collection in a town is distributed over six or seven days in the week, it follows that the proportion of lids required is not at the most more than from 7 to 8 per cent. of the number of pails used. Messrs. Haresceugh also exhibit their oak pails and ash tubs. Opinions differ

as to the relative advantages of iron and wood receptacles, but Rochdale and other towns, where iron pails were first used, are now abandoning them for wood, on the ground that the first cost is less, that they last longer, and are more easily repaired. In Manchester, however, the iron pails are preferred. Another sanitary tub and lid is exhibited by Mr. Benjamin Shaw.

Moule's Patent Earth-Closet Company have from time to time made improvements in their apparatus, and exhibit eight contrivances for the application of their system. Although the difficulty in obtaining dry earth must necessarily preclude this system from becoming universal, it is unquestionably of great value in many situations.

Mr. Adam Scott exhibits a diagram showing a section of a house and street provided with the Liernur system of drainage. We commend this diagram to the notice of all who wish to understand the Liernur system, which seems to be little appreciated or understood in England. There are many stench-traps and ventilators for sewers and drains, but no novelty that appeared to us to call for special commendation. Where the efficiency of traps or ventilators depends upon a construction that is not apparent from the exterior, we strongly advise patentees to exhibit sectional diagrams to a large scale, with explanatory notes. Messrs. Potts and Co.'s patent Edinburgh air-chambered sewer-trap, and Weaver's ventilating sewer air-trap, are the most worthy of notice, the latter more particularly on the score of economy. An improved mode of cleaning streets, consisting in the formation of cavities at intervals in the gutters for the reception of portable boxes into which the dirt may be swept, and in the employment of carts with hoisting gear for elevating the boxes, is exhibited by Mr. Brodribb. The method is ingenious, but appears unnecessarily complicated.

Mr. John Dodd exhibits several forms of ventilated closets. The patent appears to be the introduction of a metal union or elbow attached to the earthenware trap for the convenience of affixing a ventilating pipe to be carried above the roof. We consider his B pattern a more cleanly contrivance than A, and that the shape of the basin is still capable of improvement. A large 'lavatory table,' shown by Mr. Dodd, is one of the best patterns we have seen. Dr. Aldridge's patent water-closet ventilating apparatus is an arrangement by which the handle of the closet cannot be pulled up until the lid is closed. It is exhibited applied to a pan closet. We would rather advise our readers to abolish pan closets and ventilate their soil-pipes, than to use appliances of this description. A capital model is on view of Kidd's drying machine, of which we hear satisfactory accounts from Wrexham. The object of this machine is to reduce sewage sludge to 'poudrette' in order to obviate the cost of carting and spreading the more bulky raw material; by mixing this 'poudrette' with sulphate of ammonia and fine bone meal a manure is produced said to be worth from 8*l.* to 9*l.* per ton, but which can be supplied at 6*l.* 10*s.* by the Wrexham Sewage Farm Company. We shall probably give a further account of this system shortly. Messrs. Maulove, Allcott and Co.'s stand perhaps attracted more attention than any other in Section I. They exhibit drawings of their disinfecting apparatus and carboniser, also samples of the contents of ashpits, pails, garbage, etc., before and after treatment. Their system is in operation at the yard of the corporation of the city of Manchester, and will be described in our account of the 'Treatment of Refuse at Manchester.' Cinder-sifting ash-closets are exhibited by the Sanitary Economic Manure Company, Salford, and by Messrs. Hughes and Son, of Manchester; both are good, and received awards of merit. A contrivance that we particularly commend to the notice of our medical readers is an improved portable bed commode, patented by Messrs. Bradbury, Lees Road, Oldham. By a turn of the hand the commode is rendered air-tight, and the escape of effluvia prevented; the arrangement for cleansing, by pouring in water at the handle, and letting it escape at the side valve, is very simple, and all that is offensive is effectually avoided. An improvement might perhaps be made by introducing a more simple arrangement for affixing the indiarubber cushion.

In Section II., 'Sanitary Architecture and Building,' there are, if we exclude the Boulinikon floorcloth, which appears somewhat out of place, only eight exhibitors. Mr. Hildebrandt, A.S.C.E., sends some very roughly-executed drawings of a dwelling-house, with details showing heating, ventilating, fitting, draining, and 'decoration.' If this be a healthy house we can only say that Mr. Hildebrandt has been eminently successful in 'making health hideous;' for the trees which add a grim grotesqueness to the landscape, the artist has evidently had recourse to those from the nursery Noah's Ark as studies. On Mr. Atkinson's stand may be seen various samples of the silicate and enamel paints and petrifying liquid for damp walls, of the Liverpool Silicate Paint Company. We have so recently expressed a favourable opinion of these materials that we need not further allude to them. Messrs. Stiff and Sons send some good specimens of terra cotta. A new mode of building with concrete and fire-clay slabs, patented by Mr. Marsden, of Liverpool, has obtained a certificate of merit for the invention. It appears strong and economical, but without practical tests we are unable to pronounce a decided opinion on its merits. Mr. Ernest Turner's design for 'The Burdett Model Pavilion Cottage Hospital,' shows the pavilion system carried out in its integrity, and applied to a hospital for twelve beds. The design is worthy the attention of those interested in hospital construction, but we think a few explanatory notes and estimates of cost should have accompanied it. Mr. Greenway's drawings and description of his method of hospital construction were for some reason removed from the exhibition, and not re-hung before we left.

Section III. Water-supply, disinfection, heating and lighting.

Norton's Abyssinian tube-wells, pumps, etc., are among the most useful apparatus in this section connected with water-supply. Glazed earthenware cisterns, the shape of the ordinary household copper, are exhibited by Mr. Blackmore, Manchester. The material is all that can be desired, and if no objection is found to exist in weight, and connection of supply pipes, these cisterns will be extensively used. The number of filters exhibited, and the number of new patents, points to the conclusion that there is a large demand, and the inference that the public are fully aware of the necessity for pure potable water. We cannot here discuss in detail the good and bad points of all those on view at this exhibition, but realising the great importance of the subject, we hope shortly to lay before our readers in a concise and popular form a few practical hints on filtration and the action of the various media employed. We can, however, recommend Bischof's spongy iron filters as one of the best filters yet produced. Of the other filters exhibited, the silicated carbon, and Dr. Bond's floating feed filters, are most worthy of notice.

(To be continued.)

BRITISH MEDICAL ASSOCIATION.

THE forty-fifth general meeting of the Association was held in Owens College, Manchester. There was a large attendance of members.

Dr. Ransome (Manchester), chairman of the committee on registration of disease, read the report of that committee. The document contained the following passages: 'Twelve years have now elapsed since the British Medical Association, at a meeting in Leamington, appointed a committee on the subject of the registration of disease. It will be well, therefore, briefly to recall the work that it has done, and the results that have so far followed. Great care was taken in the first instance to frame a schedule of diseases that it was desirable should be recorded weekly, but which it would not be overburdensome to contributors to fill up. This schedule was adopted by the association, and was accepted by voluntary associations in Manchester and Salford, St. Marylebone, London, and Newcastle-on-Tyne, and also by Dr. R. Brown, of Preston, and Dr. A. Hill, of Birmingham. By these agencies the registration

of new cases of disease coming under treatment in public institutions was for a time regularly carried on; but one by one they have been discontinued, and at the present time the only places that are still systematically carrying on the undertaking are Manchester and Salford. In 1873 a memorial and a petition to the House of Commons was presented, pointing out that no scheme had even been proposed in the Legislature for carrying out this all-important means of arresting the progress of epidemic and other disease. In this year an attempt was made by Government to utilise the return of cases of disease occurring in poor-law practice, but the arrangements made were imperfect and unsatisfactory. No improvement has since then been effected, however, and no means have been afforded to local authorities for early intelligence of the presence of disease. In our last report it was urged that in addition to the registration of certain non-infectious diseases occurring in public practice, it was desirable that information of every case of infectious disease occurring in both public and private practice should be required from persons in charge of the case, or from the householder. Your committee can only now repeat this recommendation, and suggest that steps should be taken to frame a legislative enactment that would enforce the registration of all cases of infectious disease, on the method already approved by the association; and to this end they propose that the subject be referred to the parliamentary bills committee to consider in what form it can be best dealt with by the Legislature.' In conclusion, he moved that the report should be adopted, and the committee re-elected. Dr. Manby seconded the motion. Dr. Bond (Gloucester) proposed as an amendment that the report should be referred back to the committee, with a view to its amendment. He expressed regret that he felt compelled to oppose a committee who had done so much service to the association; but he objected to their recommendation that the parliamentary committee should be authorised to take steps with the object of obtaining the compulsory registration of disease. He apprehended that they did not exactly allude to compulsory registration, but to compulsory notification; and he was of opinion that it would be exceedingly undesirable to pursue this object without consideration of the variety of other questions which could not be separated from it. Dr. Davies (Swansea) seconded the amendment.

Dr. Ransome remarked that the mover and seconder of the amendment were labouring under a misapprehension. The committee on registration of disease did not propose that this meeting should sanction compulsory registration, but simply that they should refer the subject to the parliamentary committee for their consideration. Dr. Stewart (London) remarked that the Registration Office was now prepared to carry out the plan of obtaining weekly returns of infectious diseases throughout the country, if the Government would authorise it to do so.

The amendment on being put to the meeting was rejected, and the original resolution was afterwards carried.

The Public Health Section met under the presidency of Dr. de Chaumont, of Southampton, who, in his address, said it was not his object to praise one class of medical men as sanitarians above another, and then he pointed out the advantages to the community of special scientific inquiries on an independent basis, and vindicated the position of the medical profession in sanitary work. He maintained that the teaching habits and thoughts of the medical profession formed an excellent training for sanitary work, and whilst he admitted that many distinguished sanitarians had come from the ranks of the non-professional, he held that it was from the ranks of their own profession that sanitarians must come, for in no other profession was that class of knowledge acquired that best fitted them for this kind of work.

Dr. Ogle (Derby) read a paper on 'Preventive Medicine in Ordinary Medical Practice,' which was a sequel to the address recently delivered by Dr. Ransome on 'State Medicine.'

COMPENSATION FOR STREET IMPROVEMENTS.

LAST week a deputation of the municipal corporations presented a memorial to the President of the Local Government Board with reference to the tribunal for assessment of compensation to owners whose property has been taken for street improvements. They pointed out the unnecessary cost and vexatious delays of the present mode of assessing compensation by constituting a separate tribunal for every separate interest, and further that these evils prevented corporations from undertaking many valuable improvements, while in other cases property was bought by private treaty at excessive prices to avoid the delay and cost of proceedings. They considered that these evils would be effectually remedied by constituting one tribunal for the assessment of all the compensation payable for the property, as in the Artisans' Dwellings Act. In reply, the President said this new procedure in the Artisans' and Labourers' Dwellings Act was considered a great improvement, and the deputation had stated quite enough to show that on the score of expense, trouble, and time the alteration they asked for was justified, provided only that the rights of private individuals were not unduly pressed for the sake of town improvements. That was a point which he should have to examine into, and if he could see his way to carry out their wishes, he should be happy to do so.

THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE. PUBLIC HEALTH SECTION. THE IMPROVEMENTS IN GLASGOW.

SIR JAMES WATSON read a paper on improving the sanitary condition of large towns, as illustrated by the city improvements of Glasgow, of which the following is an abstract. There are few subjects more interesting or more important than those which relate to the general health of the community, and particularly to that of the sanitary condition of large and populous cities; these affect not only the physical, but also the moral state of society. If our population are huddled together in wretched dwellings alike unwholesome and dismal, can it be wondered that they should either resort to stimulating drinks to relieve their physical depression, or seek for enjoyment beyond their own homes. The city of Glasgow has been one of the first to set the example of seeking to remedy these defects. Edinburgh, to a limited extent, followed; and it is satisfactory to know that other towns are about to follow their example. Before the improvements were made the population were crowded together in pent-up houses and closes of about 3 ft. and 4 ft. wide, with large tenements of three and four stories rising on each side, and running backwards to the extent of 250 ft., and in some cases 280 ft., to which neither the light nor the air of heaven could freely penetrate. A large portion of these dwellings were dark, dismal, and unwholesome, devoid of comfort and family accommodation, and inhabited by the lower and criminal classes of the population. When fever or contagious disease broke out in these places the results were appalling. As an instance of this, it had been shown that even as late as 1871, in one district the death-rate was 70 in the thousand. The moral disease was not less appalling, the houses being to a large extent receptacles of pauperism, disease and crime. To remedy this state of things measures were adopted by the corporation. The city was surveyed with the view of clearing out those objectionable districts. The plan was a bold and extensive one; it swept away whole streets of unwholesome houses in order to obtain breathing spaces, and formed broad, spacious streets and open spaces in their stead. Power was asked from Parliament to expend 1,250,000*l.* in the

purchase of property, and to assess by taxation 6*d.* per pound on rental for five years, and 3*d.* per pound for ten years. In the Parliamentary session of 1866 the Improvement Act was passed almost without opposition, and immediately thereafter a committee was appointed for carrying out its provisions. A tax of 6*d.* per pound on the rental of the city, to be paid by occupiers, was imposed for the first year. Negotiations were entered into for the purchase of properties, and a bank credit was arranged for until the tax could be collected, and money borrowed on the security of the trust. By the end of the first year the committee had secured by private bargain property to the extent of 50,512*l.*, and loans had begun to come in freely on the security of the trust at the rate of 4 per cent. per annum. These purchases have gone on from year to year, and the sum paid for properties up till May 31 last amounted to 6,112,504*l.* In addition to this, the committee purchased and paid 40,000*l.* for a public park for the use of the citizens. The tax, which was 6*d.* in the pound for the first year, was in the second reduced to 4*d.*, at which it was continued for four years—namely, till 1871. Afterwards it was reduced to 3*d.* for two years, and since then to 2*d.*, at which it now stands. In about two years after the passing of the Act there was commenced that process of demolition which has been carried on gradually up to the present time, by which old and dilapidated buildings were removed, the haunts of the criminal classes broken up, breathing spaces opened in pent-up lanes and closes, playgrounds procured for children, old streets widened, and new streets driven through the most densely crowded districts. The effects of these changes on the health of the inhabitants, and more particularly on that of the children, have been very striking, the procuring of open playground having in many cases wholly changed their sickly appearance to that of robust health. The clearances thus effected, along with the other clearances made by the Union Railway Company, have led to a diminution of crime, and have besides given a power and control to the police over the persons inhabiting these districts not formerly possessed. It is consequently found that while between the years 1867 and 1873 there is a diminution in the total cases of crime annually reported of 3,030, there is an increase in the apprehensions of 749. In about five years after the passing of the Act the Committee began to dispose of the ground for carrying out the improvement plans, and the prices realised have exceeded their expectations—in some cases more than sufficient to recoup them, in others less. Since the passing of the Act there have been provided 40,460 houses within the municipality, giving accommodation for 202,302 persons; while within a radius of half a mile of the city there has been provided accommodation for not less than 100,000, making accommodation for 302,300, to meet the natural increase of the population and the 28,965 persons displaced by the Improvement Act. In the early stages of their displacement some fears existed on the part of the committee as to finding accommodation for the population so displaced. Two large plots of building ground in the immediate vicinity of the town, and costing about 74,000*l.*, were therefore purchased, so as to give ground off to builders at moderate rates for erecting such houses. The plan proved eminently successful, and has resulted in a profit of about 30,000*l.* In the displacement of many the committee found that there were living in these localities certain poor persons unable to pay for more than the most miserable accommodation—viz., 1*s.* or 1*s.* 6*d.* per week. To provide for such, and as a single apartment in the new buildings could not be had under 5*l.* or 5*l.* 5*s.* per annum, or say from 6*s.* 8*d.* to 8*s.* 3*d.* per month, the committee erected model lodging-houses in six different quarters of the city, the cost of lodgings, including fire, gas, and cooking utensils, being 3½*d.* per night, or 1*s.* 9*d.* per week, Sunday being allowed gratis. These have been taken advantage of to a large extent, and are self-supporting. Lastly, as to the cost. The property sold, and what is on hand, moderately valued, amounted on May 31 last to 1,647,332*l.*, while the sums paid amount to 1,612,504*l.*, showing a difference of 34,828*l.* in favour of the improvement; so that these properly speaking may be said to have paid themselves. Taxes, however, have been raised to the extent of 283,462*l.*, and there is still to raise at 2*d.* in the pound for four years 80,000*l.*, making in all 363,462*l.* From this has to be deducted the price of a public park purchased and made over to the citizens, 40,000*l.* If from this we deduct 18 acres of most valuable ground thrown into streets and open spaces, valued at not less than 100,000*l.*, and a further sum for paving streets and for construction of sewers—say 65,000*l.*—you reduce the actual cost of the improvements to 178,462*l.*, arising from waste rents of ground remaining for a time unbuilt upon before being sold, Parliamentary expenses, and expenses of management.

After Sir James Watson had read his paper, which was illustrated by maps and photographs, showing the condition of several blocks of buildings in their original and reconstructed state, observations were offered by Mr. Whittaker, of Belfast; Mr. A. E. Quicknight, of Edinburgh; Dr. Lake, Mr. Turner, of Bristol; Mr. Hewitt, of Bedford; and Dr. Farr. The object of the speakers was to point out various matters to which, with reference to the special circumstances of particular towns, attention should be given in preparing and carrying out improvement schemes. By all the value of Sir James Watson's paper and the importance of the service which Glasgow had rendered to the other towns within the kingdom were heartily acknowledged. Dr. Farr, in particular, alluded to the immense advantage which Glasgow derived from its excellent water-supply, and the facility which that supply afforded for improving the natural condition of the people. He paid a tribute to the energy and foresight which had led the people of Glasgow to secure that advantage, and to follow it up by the schemes which had been described by Sir James, and he expressed a hope that some information would be given as to the present position of the question as regarded the purification of the Clyde. On the invitation of the chairman, Mr. Marwick, town clerk of Glasgow, briefly stated the result of the inquiries which had been instituted by the corporation, first by Messrs. Bateman and Bazalgette, and lately by Sir John Hawkshaw, under a commission issued by the Government, and the expense of which had been paid for. All these gentlemen had recommended a system of sewers which should intercept the sewerage of the city and other towns, and carry it out to the sea. With a view to the adoption of some means for purifying the Clyde and securing the enforcement of the River Pollution Prevention Act of last session, a bill was introduced into Parliament by the corporation of Glasgow and some neighbouring towns for subjecting the whole watershed of the Clyde and its tributaries to a board of conservators, to be elected by the several authorities in the conservancy area; but the bill was threatened with serious opposition by the outlying districts and by several of the towns. In these circumstances the promoters had urged the Government to deal with the question by a public measure, and, on receiving a promise that this would be done, had withdrawn the bill. It was interesting to know that since the bill had been withdrawn the general principles involved in it had formed the subject of careful investigation by the House of Lords in connection with the Thames floods, and the report confirmed at once the general views expressed by Sir John Hawkshaw as to the conservancy area, and the provisions of the Clyde Conservancy Bill.

The chairman concurred in the views expressed as to the importance of the experiment which Glasgow had so successfully made, but took occasion, while bearing warm testimony to the value of local government, to suggest that no local board should be allowed to borrow money for effecting improvements, and so to impose burdens on posterity, until the proposed improvements had been examined and recommended by a board qualified to judge of them. This, the chairman, thought, was not

secured by the existing arrangements through the Treasury, which often granted loans for unwise and sometimes inconsistent schemes.

Medical Officers' Reports.

CITY AND COUNTY OF HEREFORD.—An extensive and severe outbreak of scarlet fever occurred during the year 1876 in most of the country districts, and presented a worse type than in other places in the vicinity of the Wye, which was very offensive. Dr. Sandford mentions that a ploughing-match dinner was to be held in a house where there were five children affected with scarlatina, when, receiving information of it, he obtained a magistrate's order to close the house. The Act under which he closed the house is not mentioned, but as it is the first occasion on which we have known it done, consider it should have been stated. A house to house survey of the city was carried out, and 200 nuisances found in 3,300 houses. The population is said to be about 18,900; the births for the year 446, and the deaths 447, the death-rate being 23·4 per 1,000 population. This excess of deaths over births is most unusual, and was caused by the excessive mortality from scarlet fever, which amounted to 3·90 per 1,000. In the Ledbury rural sanitary district the annual death-rate was 16·1; in Weobley district, 13·6 per 1,000; in Hereford rural district, 22·70; and in Leominster rural district, 17·2 per 1,000. No return is made for the Bromyard rural district, as this authority has refused to continue in combination with the others.

HASTINGS.—The birth-rate was 29·48, and the death-rate 18·51 per 1,000 living during the quarter ending March 31 last. The total deaths were 162, of whom 40 were visitors, and the deaths under one year were 29, or 11 per 100 births, which is a very small average. There were 24 deaths from consumption, 10 being of visitors. Mr. Ashenden states that a disinfecting apparatus has been erected at a cost of 135*l.*, and other improvements effected; and that a large number of dilapidated and unwholesome houses had been examined and reported upon; and that seven — a very small number — articles of food had been analysed, two of which were adulterated to a slight extent.

WHITBY.—The birth-rate for the quarter ending June 30 is reported as having been 33, and the death-rate 23·5 per 1,000 living in this urban district, which includes Whitby, Ruswarp, and Hawsker. There were 79 deaths, out of which 21, or 26·6 per cent., were under one year, which, taken with the 19 per cent. deaths under one year of the total births, shows great want of care or bad sanitary arrangements. There has not been any death from small-pox, measles, fever, scarlatina, or other infectious diseases during the quarter. The death-rate is higher than usual, partly in consequence of the high death-rate among 'infants, chiefly from bronchitis and infantile maladies.'

Law Reports.

NUISANCE FROM SMOKE.

AT Southwark police-court, Messrs. R. and W. Foster, indiarubber manufacturers, Grange Road, were summoned under the Smoke Acts, for allowing smoke to escape from a chimney on their premises. The offence was clearly proved. The defendants had been several times cautioned, and on one occasion fined. Mr. Benson imposed a penalty of 10*l.* and costs. Mr. France, of Stanton Wharf, Pickle Herring Street, was summoned for a similar offence. In this case the smoke was attributed to bad fuel. The defendant had ordered improved furnaces, and Mr. Benson thought a fine of 20*s.* and costs would meet the case.

POLLUTED WELLS.

MR. A. J. WOOD, clerk of the Richmond Rural Sanitary Authority, supported two summonses for the closing of polluted wells. In the case of R. Maunder, 47 Lilian Road, Barnes, the defendant was represented by a person who said he had received orders to lay on water from the company's main. The inspector of nuisances said he visited the premises and found the well still in use, and exceedingly foul. Mr. Paget adjourned the summons for the works to be completed. Mr. Wood stated that they required the well to be closed. In the other case there was no service of the summons, the owner being in America.

BREACH OF THE EXPLOSIVES ACT.

AT the Thames Police Court, J. Franklin, of 10 Colebrook Terrace, was summoned for selling gunpowder to a child apparently under thirteen years of age. W. Saunders, eleven years of age, said that about three weeks ago he went to a shop in Leman Street, and purchased a halfpennyworth of gunpowder of the defendant, telling him it was to 'blow his mother's copper up.' He let it off in the street. The defendant did not ask him how old he was, but told him if he let the powder off in the street he would be locked up. A little boy named Samuel Mendoza was brought forward. Superintendent Arnold said the little fellow was partly blinded in consequence of the previous witness firing the gunpowder in the street, and it was a question whether he would ever entirely recover his sight. Mr. De Rutzen said it was a very useful and proper provision that gunpowder should not be sold to boys, and it was not an Act of Parliament which ought to be treated lightly. He fined the defendant 3*l.*

SENDING BAD MEAT TO LONDON.

J. HALLAM, a dealer, of Kirkington, Nottinghamshire, was summoned for sending bad meat to London for human food. One of the inspectors said that on the morning of July 17 a salesman in the market called his attention to the carcase of a pig. It was disgusting, and totally unfit for food. The animal had not been properly slaughtered, for the throat had been cut across instead of down straight in the usual way. The carcase weighed about 78 lbs. The defendant bore a very good character in his own neighbourhood, but he was a man who went about among the farmers and bought whatever animals had 'dropped' on the different farms. Mr. Ricketts said he was a bricklayer at Kirkington, in Nottinghamshire. He sent for the prisoner to kill the pig, as it was ill. He did not sell it to the defendant as human food, but gave the carcase to him to do what he liked with. A veterinary surgeon had attended to it. Mr. Alderman Finnis sentenced the defendant to one month's imprisonment, without the option of a fine.

LONDON GIN.

J. STONE, of the Royal Oak, Spencer Street, Goswell Road, was charged with selling gin containing an undue proportion of water. Defendant sold a bottle of gin for 2*s.*, which contained 44 per cent. of water. Mr. Bryson, for the defence, said there was no standard of quality for gin, but the Government had the matter under their consideration, and in view of that fact he urged that a small penalty should be inflicted. Mr. Hosack said nobody could expect to get good gin for 2*s.* There was nothing but water in the gin, which was a material fact. Defendant would be fined 5*s.* Matilda Brotherhood, of the Miller's Arms, Goswell Road, was charged with a similar offence. The inspector said in this case he bought a bottle of the 'very best gin' for 2*s.* 3*d.* On analysis it was found to contain 56 per cent. of water. Mrs. Brotherhood said the gin had been in a dry cupboard since Christmas, as they had little sale for bottled spirits, and she thought some of it must have evaporated. Mr. Hosack said the percentage of water was great for 'very best gin.' He fined defendant 20*s.*

DEFINITION OF 'OFFAL.'

MR. TERRY, of Acton, was summoned by the local board for causing a nuisance by boiling offal and blood. The defendant kept a large piggery and a boiling-house, which was used for the purpose of boiling refuse, collected from hotels and clubs, to feed the pigs, the fat being extracted for sale. Mr. Palmer said it was used for butter and other purposes. The deputy-inspector said the defendant told him that he would not do anything to injure persons, but he should not discontinue boiling. Mr. Paget confined the case to the terms of the summons. He said offal and blood meant things which came from slaughter-houses. He could not extend the summons. Mr. Palmer contended that it was sufficient to prove that the premises were a nuisance. He called Mr. Francis, medical officer of health for Acton, who stated that he had seen offal on the premises, animal and vegetable refuse. He considered vegetable refuse to be offal. Mr. Paget did not think it was offal. Offal and blood in that conjunction meant offal from a slaughter-house. He dismissed the summons.

SELLING BREAD WITHOUT WEIGHING IT.

AT the Glasgow Central Police Court, W. Garraway, baker, was charged with selling bread not by weight. The Fiscal stated that some time ago the attention of the police was directed by petition to the fact that bread was being sold not by weight. Five or six years ago there were a good many prosecutions with the object of opening the eyes of the bakers to the necessity of complying with the Act. Again complaints had been made, and he had been directed to prosecute. As the Act of Parliament had to some extent been in abeyance, he had deemed it right before prosecuting to give notice to the bakers, and this had accordingly been done. An officer of the sanitary department deponed to purchasing a loaf from the shop of the accused without getting it weighed. The evidence having been completed, the Fiscal said that complaints had been made of the 3½*d.* loaf being light in weight, and often the 2lb. loaf sold at that price was no such thing. It was in order to put a stop to this practice, and to ensure that people got proper weight, that the prosecutions had been instituted. He did press for a penalty. The Bailie said this was a very important case, and the Fiscal had done very right in bringing it before the court. He had made some inquiry into the matter since it came before the magistrates, and he found that a great many other parties besides bakers sold articles without weighing them out to their customers. Tea and tobacco were often done up in parcels and handed out without being weighed. The system was injurious in many ways to society. He had made some inquiry regarding the dear loaf and cheap loaf. A woman having five or six lodgers buys loaves for them at 3½*d.*, and enters them in their books at 4½*d.* This came to be a serious matter for the lodgers, who perhaps consumed each six loaves in a week. This was deliberately putting temptation in the way of certain people. He would certainly insist upon all bakers weighing their bread. He was glad that the Fiscal did not want a conviction, but it was necessary that the practice should be put down. After some further discussion, the Bailie said he would consult with his brother magistrates as to whether they should insist upon all bread being weighed, or whether they would adopt the stamp. The accused was allowed to go, the Fiscal intimating that the decision would be advertised.

DAMAGE BY FLOODS.

LORD JUSTICE FRY has had before him the case of *The Nitro-Phosphate Co.* v. *St. Katharine's Dock Co.*, an action to recover 7,000*l.* damage done to property of the Nitro-Phosphate Manure Company by the inflow of water to their premises during the high tide of November 15, 1875. The plaintiffs are a company, established for the manufacture of artificial manure, at Plaistow, on the north side of the Thames. The defendants are the owners of docks which were originally the Victoria Docks, constructed under an Act of 1850, extended by an Act of 1853, and vested in the London and St. Katharine's Dock Company by an Act of 1864. Their docks are approached from the Thames by an artificial channel passing under a public road leading to North Woolwich, and dividing their premises from those of the plaintiffs. In the morning of November 15, 1875, the water overflowed the docks, crossed the road, and, entering the plaintiff's premises, caused the damage for which it was now sought to make the defendants answerable. The plaintiff's case was that the overflow would not have occurred if the defendants had properly performed the duty cast upon them by Parliament of keeping efficient barriers to a specified height above Trinity high-water mark; while the defendants maintained that the injury was due to the act of the plaintiff's own servants in opening a gate during the flood and thereby admitting the water.

His lordship held that the defendants could not avail themselves of the contention that the damage was the act of God when they had not performed their own duty, unless they could show that if they had done their duty the damage would have followed. The dock company had not convinced him that if they had complied with the conditions imposed upon them by Parliament any damage whatever would have accrued to the plaintiffs, and he could not determine how much of the damage was due to their negligence, and how much to the act of God. The plaintiffs were liable to pay the amount of the damage, and there would be an injunction to restrain the defendants from permitting the banks of their dock, or the channel, to remain at a level lower than four feet above Trinity high-water mark.

LIBEL BY A MEMBER OF A LOCAL BOARD.

THE case of *Matthews* v. *Harvey* has been tried in the Western Circuit. The plaintiff carried on the business of a brickmaker. The defendant was a lodging-house-keeper; they were both members of the local board of health at Weston-super-Mare. The action was for libel. Last year the board resolved to make a drain, called the Whitecross sewer, through a part of the town, and the plaintiff, making a large quantity of bricks of the kind necessary to be used in the construction of the sewer, he arranged with the contractor, Mr. Haynes, of Swindon, to supply him with bricks. Before the bricks were delivered plaintiff gave strict orders to his foreman to send none but proper bricks, and informed the contractor that if any bricks were unfit for use they were to be returned. At a meeting of the board, on January 10, an attack was made on the plaintiff, and it seemed to be a preconcerted one. Immediately after the meeting a report of the proceedings appeared in the local papers, and in one was headed 'Reminiscences of the Past.' Defendant, at the meeting, said that bricks were being put into the Whitecross Street sewer that would crumble into dust; in fact, some of them were most vile and unfit for use. Mr. Cole then called attention to the letter containing the libel. One paragraph said, 'Now, as to the surveyor; Mr. Matthews wrote asking the surveyor to visit his yard to view his beautiful bricks, but the surveyor was not to be bought or trapped in that way.' He then referred to the other meetings of the board, and to correspondence that passed between the parties. At the next meeting Mr. Harvey made a long statement, justifying what he had previously said, and then stated that he had been to the works and found 1,700 bricks in one stack and 1,000 in another all condemned, and that all came from the plaintiff's pottery. That was an utter and entire falsehood. Out of 18,000 supplied, only 360 were sent back. On March 14 the plaintiff attended a meeting, and explained about the bricks satisfactorily, as he thought, but the defendant sat down and wrote a letter to the two local newspapers. One refused to insert it, and the other did so after toning it down, and inserting it as an advertisement. The letter sent as an advertisement was headed, 'Royal Soft Bricks,'

and it stated that he (plaintiff) admitted that nearly 400 bad bricks were returned to his yard as not fit to put in. 'That fact speaks for itself, and was one load out of the two or three. In my opinion a great many more ought to have been returned, but I am satisfied with that admission. Mr. Matthews says I ought to have come to him privately. What for, I wonder? To have a plum, so as not to be able to see soft bricks? Mr. Matthews characterised public duty as "cant and humbug when it affects his own selfish interests, and says it is false and malicious to state what is true" when he is one of the offenders.' The letter went on to say—'I think I have said sufficient to vindicate myself from the aspersions of Mr. Matthews, and I hope it will teach him a lesson not to send such vile rubbish for public drainage works.' The Lord Chief Justice, in summing up, said the libel was a serious one, but it was for them to judge whether the defendant had received provocation that would lessen the damages to the smallest point. Verdict for the plaintiff, damages 50*l*.

LONDON MEAT CASES.

AT Guildhall S. Ward, a butcher, of Peterborough, was summoned for sending unwholesome meat to London. Mr. Baylis stated that on June 4, King and Covell, meat salesmen, called the attention of one of the inspectors to four pieces of beef which had been sent by the defendant. The inspector seized them, and they were condemned. Wylde, an inspector, corroborated. The defendant stated to him that he had bought the animal from a butcher, named Mackney, of Stanground, who stated that it had been struck by lightning. He gave 50*s*. for the carcase, and sent it to King and Covell, telling them that if it was not fit for food not to sell it. If the animal had been in good health it would have weighed double the weight and been worth about 25*l*. The meat was wet and emaciated, and unfit for food. Mr. Beard said he did not propose to dispute any part of the statement made by Wylde, but he put this case before the Court as one of an exceptional nature. The defendant had purchased all the meat he wanted, and was offered this beast cheap, and was tempted to buy it. He sent it to the London market in the belief that it was good, as it had been bled and dressed by another butcher, who assured him that the beast had been killed by lightning. Moreover, the meat was delayed on its journey from Saturday until Monday. Sir Thomas Dakin said it was a very serious offence. Here was a man buying an animal which, if in good health, would be worth 25*l*. for 50*s*., and sending it to London to sell as food on the chance that it might pass the inspectors. He ought to have known that it was not fit for food, and he would be fined 10*l*. and three guineas costs.

T. Sharp, a butcher of Marnhull, Dorsetshire, was summoned for a similar offence. On June 4th last the defendant sent to Mr. Filter, a salesman in the Central Market, two sides of beef. The beast had been suffering from disease in the mouth, and had wasted away. It belonged to Meetyard, a farmer, who had sold it to Miles another farmer. After a time, Miles had returned it in a worse condition than it was when he took it. Had the animal been healthy and well it would have been worth 17*l*., but in the condition it was it was bartered to the defendant for some pigs worth about 7*l*. The weight of the two sides of beef was only 280 lbs. Mr. Filter said the defendant had consigned meat to him for some years. As a rule it was good. About nine years ago he was summoned for sending objectionable meat. He differed from Wylde, who stated that the meat was wet and emaciated. He called Wylde's attention to the fact that although the meat was poor, it was dry. He did it because the law was all on one side, and he wished to have the case fairly tried. Mr. Beard said that Mr. Filter was a salesman in the market, and respectable. Sir T. Dakin replied that no doubt he was, but he did not like the way in which he had given evidence in order to bolster up the case. Mr. Baylis said he was sorry to say that such evidence was frequently given. The defendant's own witness said that the meat sent up was 'as a rule good,' clearly showing that he sometimes sent up meat that was not good. He would be sentenced to one month's imprisonment, without the option of a fine.

PUTRID HAMS AT TAUNTON.

GEORGE EAGLING, provision dealer, was charged with being in possession of and exposing for sale thirty pieces of meat which were unsound and unfit for food. Mr. Strawbridge, inspector of nuisances, stated that he was in the Taunton market, and went to a bacon stall. He there saw the defendant selling bacon. He had a number of hams exposed on the stall for sale, and witness saw him cutting several pieces, and from what he could see it was not fit for food. He ordered him not to sell any more and had it seized. He removed what was on the stall, and also a large unopened box, which was standing on the Parade near the stall. He should think there were thirty pieces on the stall which he had seized. The meat was removed to the Shire Hall. The hams were soft and flabby, and when cut seemed quite putrid. By the bench: A piece of the meat seized was marked 5*d*. per lb. Defendant asked witness if the piece marked '5½*d*.' was not good to eat. Witness replied that it was not. Mr. Cornish, F.R.C.S., said he examined the meat spoken of at the stall on the Parade, his attention having been called to it by the clerk to the market. He examined several pieces of ham which were soft and flabby and partially decomposed. It was unsound, unwholesome and dangerous to be used. Mr. C. J. Fox said the defendant had a stall in the market on Saturday, and was selling bacon and ham. He called Mr. Cornish's attention to the stall. Mr. Cornish examined three pieces on the stall, and did not find much fault with them. Then he examined some pieces under the stall, which he condemned. He heard the defendant early in the morning order the man who was employed by him to tie them up, as they were unfit for sale. The defendant said that these cases were sent from London as samples, and were of a different kind to those he usually sold—he generally sold smoked hams. The first he saw of them was that morning. He then put them on the stall for sale whole. As he opened some of them he found they were tainted, and he put them under the stall so that they might not be sold. The mayor said the bench were determined to put an end to anybody bringing anything to the Taunton market, which was likely to be injurious to the consumer. There could be no doubt that what defendant brought to the market was to a great extent unfit for human food, and the bench would mark their disapproval of the defendant's conduct by fining him 20*s*. for each of nine pieces of ham, and a whole ham condemned, making a total penalty of 10*l*., with costs, the whole amounting to 12*l*. 1*s*. Mr. Cornish asked for a fee of two guineas. The mayor could only allow the usual fee of a guinea. The condemned meat must be destroyed.

Legal Notes and Queries.

FOOD ANALYSIS.—JURISDICTION.

SIR,—I should feel much obliged if you would kindly advise me on the following points in your next issue.

The C. Poor Law Union is situate within the county of G., but comprises certain parishes in the city of B.

The 'Guardians of the Poor' (not the rural sanitary authority) have directed a sample of the milk supplied at the union to be analysed (sec. 12, 38 & 39 Vict. c. 63). Should the sample be taken to the city or county analyst, to enable the analyst's certificate to be received as evidence,

under sec. 21 of the above Act, and should proceedings be taken before the city or county justices?

SANITARY INSPECTOR.

[It appears to us that it is optional with the guardians which analyst they employ. We base this opinion on the analogy furnished by the fact that guardians already have, we believe, an option in taking legal proceedings, where their union extends into the jurisdiction of more than one bench of magistrates.—ED.]

NAMING STREETS AND NUMBERING HOUSES.

THE Public Health Act, 1875, sec. 160, incorporates various provisions of the Town Improvement Clauses Act, including that with respect to 'naming the streets and numbering the houses.' The local board of E. has, since its formation, changed the names of several of its streets, and ordered all the houses to be numbered. No formal resolution of the board to change the names and number the houses has been entered on the minutes of the board meetings, as the work has been done by the highway committee, with the tacit consent of the board. Various owners of houses in the roads in which the names have been changed object strongly to the change, and allege that the change in the names of the streets will create considerable confusion and difficulty hereafter in dealing with the property. Your advice is requested—firstly, whether the board have power to change the names of the streets as and when they please; and, secondly, whether a minute should be entered in the minute-book of the board of a resolution changing the various names of the streets, and also, as regards the numbering of the houses in them?

A CLERK.

[The first question must, we think, be answered in the affirmative. There might easily occur sufficient reasons why it was expedient to replace one name by another, even where the former had itself been selected by the local board. Of course such a thing should not be done vexatiously and without some good reason. 2. This is a question of business arrangements, depending on the practice of the board as to the functions which it is accustomed to delegate to its committees. The most regular and convenient practice is for a committee which recommends anything to have its recommendation entered on the board minute-book as 'adopted,' or the contrary, as the case may be.—ED.]

UNFENCED PIT NEAR A HIGHWAY.

SIR,—In the rural sanitary district of A. there is an old coalpit, situate in a field adjoining the highway, and within fifty yards of the same. The fence adjoining the highway is bad, the pit shafts are also unfenced, consequently there is continual danger of children falling therein. The owners of the said shafts cannot be found, and it being extremely dangerous, I wish to ask your opinion whether the rural sanitary authority of A. are liable to fence the said shafts, or in any way responsible should any accident occur. I believe the 41st section of the Coal Mines Act, 1872, refers to something of the kind; does that section apply to a rural sanitary board?

Your opinion on above in your next issue will oblige,

A SUBSCRIBER.

[We do not think that under the circumstances stated the rural sanitary authority has any power or any responsibility with respect to the fencing of the coalpit. The owner should be indicted. It seems strange to say that the owner cannot be found. Is nobody in occupation of the land adjacent? It is clear, however, that the whole subject is not a sanitary but a highway one, and we recommend application being made to the highway authority. They may be, perhaps, able and willing to move in the matter.]

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

VITAL STATISTICS.

(*To the Editor of the* SANITARY RECORD.)

SIR,—As in your issue of August 3, Dr. Syson claims me as one of the uncompromising antagonists of the Registrar-General in such a manner as to lead your readers to suppose that I have advocated the doctrine that a high birth-rate necessarily implies a high death-rate, I desire to say that I have never held any such opinion. On the contrary, statistics show that a high birth-rate should induce a low death-rate. This anyone can calculate for himself by the aid of the Census returns and the English Life-Table, where he will find that localities having a high birth-rate have also a low normal death-rate—that is to say, a death-rate calculated by the English Life-Table on the ages of the residents. If, in these localities, a high death-rate occurs, the reason has to be sought for in some of the local circumstances of the place.

The point on which I chiefly disagree with the Registrar-General is the value to be assigned to the difference between the normal and the actual death-rates. They were, and to a certain extent are now placed before the public as though the differences arose entirely from avoidable causes—that is to say, from bad sanitary conditions, whereas in many instances they depend to a very great extent on the varying amounts of the necessaries of life possessed by, and on the different social conditions of, the population. It is true that the influence of density of population and various other causes of an increased death-rate is shown from time to time, but the doctrine of the necessary coexistence of a high death-rate and bad sanitary conditions seems to me to have been too strongly dwelt upon. There can be no doubt that a high death-rate should always lead to a very careful consideration of the causes, but I do not think that a locality should be deemed essentially unhealthy because a high death-rate is coexistent with great density of population, poverty, and vice.

That a high birth-rate and a low death-rate are frequently concurrent even in town districts, I may refer to Middlesborough, with a birth-rate of 41·5, and a death-rate of 15·4; of Barrow-in-Furness, with a birth-rate of 39·0, and a death-rate of 16·3; of Reading, with 37·2 and 17·9 respectively; of South Shields, with 40·3 and 18·5; of Newport, with 37·6 and 18·5 respectively; and several others. As regards the low birth-rate of many of the healthy districts, that arises to a certain extent from the number of servants and other residents who are unmarried; but if we compare the birth-rate with the death-rate of many of these places, we shall find that the latter is frequently less than one half of the former, so that in spite of a low birth-rate, they are eminently places occupied by an increasing and not a stationary population. Amongst these localities we may mention Kingston, Bexley, Staines, Barnet, and part of Romford.

There are other points on which I have objected to the Registrar-General's statistics, but they applied to the metropolis alone, where there is extreme difficulty in determining the true death-rate of a district, but I have never questioned the accuracy of the figures, indeed, on the contrary, whenever I have recalculated the results, I have been astonished to find them so correct. I am certain that if any one wishes to obtain true conclusions, he can get them from the figures given, if he will use a life table and the means for corrections given in the various reports as regards deaths in hospitals, etc., which to a certain extent affect the crude figures. There is, as I have said, greater difficulties as regards the metropolitan district, but if it be remembered that the deaths assigned to a district are always those registered in it, except when tables with

corrected death-rates are occasionally published, any marked errors may be avoided. The figures for the corrections are to be found in the same annual reports with the crude numbers as far as it is possible to give them. I should certainly be better pleased if in each annual summary for London the deaths in hospitals and extraneous workhouses were deducted from the districts in which they are registered and distributed, as regards the former, over the whole of London *pro rata* to population, because the public as well as medical officers of health would then be informed of the approximative death-rate of these large districts.

JOHN W. TRIPE, M.D.
Medical Officer of Health, Hackney.

Town Hall, Hackney, E., August 16, 1877.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

ALLEN, Richard Grammer, L.R.C.P. Edin., M.R.C.S. Eng., has been appointed Medical Officer of Health for the Belper Urban Sanitary District.

BIRKBECK, Henry, Esq., has been appointed Treasurer to the East Dereham Local Board and Urban Sanitary Authority.

CARRUTHERS, William, M.R.C.S. Eng., L.S.A. Lond., has been reappointed Medical Officer of Health for the Halton Sub-District of the Runcorn Rural Sanitary District, at 50*l.* for one year.

COOPER, Mr. Frederick, has been appointed Surveyor, Inspector of Nuisances, and Collector to the Corporation and Urban Sanitary Authority of Bridport, vice Patten, deceased.

DUXBURY, Mr. Thomas, has been appointed Gas Manager to the Over Darwen Local Board and Urban Sanitary Authority, Lancashire, vice Marsland, resigned.

EDWARDS, Mr. G., has been appointed Consulting Engineer to the Corporation and Urban Sanitary Authority of Stockton, at 100*l.* per ann., on resigning as Surveyor.

HANDLEY, Mr. Edward Thomas, has been reappointed Inspector of Nuisances for the Upper Sedgley Urban Sanitary District.

HARVEY, Mr. Sidney, has been appointed Public Analyst for Folkestone, Kent.

HOSEGOOD, Samuel, M.R.C.S. Eng., L.S.A. Lond., has been reappointed Medical Officer of Health for the Swinton and Pendlebury Urban Sanitary District, Lancashire, at 50*l.* per ann.

MACKINTOSH, Angus, M.D. Univ. Glasg., L.F.P.S. Glasg., has been reappointed Medical Officer of Health for the Brampton and Walton Urban Sanitary District, Derbyshire.

MITCHELL, Mr. William Henry, has been elected a member of the Sowerby Local Board and Urban Sanitary Authority, vice Crossley, deceased.

NANKIVELL, Mr. William Henry, has been appointed Surveyor and Inspector of Nuisances to the East Dereham Local Board and Urban Sanitary Authority.

NANKIVELL, Mr. W., has been appointed Collector to the East Dereham Local Board and Urban Sanitary Authority.

O'MEARA, Timothy, L.R.C.P. Edin., L.R.C.S. Edin., has been reappointed Medical Officer of Health for the Newbold and Dunston Urban Sanitary District, Derbyshire.

PARSONS, Francis John Crane, L.R.C.P. Lond., M.R.C.S. Eng., L.S.A. Lond., has been reappointed Medical Officer of Health for the Bridgwater Urban Sanitary District at 50*l.* for one year.

PEACOCK, Edwin, M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the Nuneaton Urban Sanitary District, vice Pitt, resigned.

SAUNDERS, Mr. James, has been appointed Clerk to the East Dereham Local Board and Urban Sanitary Authority.

SHARR, Mr. James, has been elected a Member of the North Bierley Local Board and Urban Sanitary Authority, vice Holdsworth, deceased.

SUTCLIFFE, Mr. Thomas, has been elected a member of the Brampton and Walton Local Board, Derbyshire, vice Hewitt, deceased.

SALMON, Robert, Esq., has been appointed Treasurer to the Corporation and Urban Sanitary Authority of Bridgwater, vice Smith, resigned.

WALKER, Thomas Alfred, L.R.C.P. Edin., and L.M., M.R.C.S. Eng., has been appointed Medical Officer of Health for the Upper Sedgley Urban Sanitary District, vice Ballenden, whose appointment has expired.

WEAVER, Frederick Poynton, M.D. Univ. Lond., has been reappointed Medical Officer of Health for the Frodsham Sub-District of the Runcorn Rural Sanitary District at 50*l.* for one year.

WILLETT, James, M.R.C.S. Eng., L.S.A. Lond., has been reappointed Medical Officer of Health for the Budworth Sub-District of the Runcorn Rural Sanitary District, at 50*l.* for one year.

VACANCIES.

BARROW UPON SOAR RURAL SANITARY DISTRICT. Leicestershire. Medical Officer of Health for the Quorndon Sub-District 20*l.* per ann. and 45*l.* per ann., and fees as Medical Officer for the Quorndon District of the Union. Application, 27th instant, to William White Goode, Clerk to the Authority, Loughborough.

BURTON-ON-TRENT RURAL SANITARY DISTRICT. Two Medical Officers of Health: 50*l.* per ann. each for three years. Inspector of Nuisances: 200*l.* per ann. for three years. Applications, 25th instant, to William Coxon, Clerk to the Authority.

CHESTERFIELD, CORPORATION OF, AND URBAN SANITARY AUTHORITY. Surveyor. Public Analyst. Applications, 24th instant, to John Cutts, Town Clerk.

COSFORD RURAL SANITARY DISTRICT, Suffolk, Medical Officer of Health for the Bildeston Sub-District. Application, 25th instant, to R. Newman, Clerk to the Authority, Hadleigh.

DORKING RURAL SANITARY DISTRICT. Surrey. Inspector of Nuisances: 120*l.* per ann. for two years. Application, 29th instant, to P. L. Marten, Clerk to the Authority.

GARSTANG GUARDIANS AND RURAL SANITARY AUTHORITY. Lancashire. Clerk.

LUDDENDEN-FOOT LOCAL BOARD AND URBAN SANITARY AUTHORITY. Yorkshire. Surveyor.

NEWBOLD AND DUNSTON URBAN SANITARY DISTRICT. Derbyshire. Inspector of Nuisances. Application to J. G. Young, Clerk to the Authority.

RADNORSHIRE. Public Analyst: 21*s.* per analysis and travelling expenses when attending to give evidence. Application to the Clerk of the Peace, Presteign.

RIPLEY URBAN SANITARY DISTRICT. Derbyshire. Inspector of Nuisances.

STOCKTON ON TEES, CORPORATION, AND URBAN SANITARY AUTHORITY OF, Surveyor: 300*l.* per ann.

THETFORD URBAN SANITARY AUTHORITY. Norfolk and Suffolk. Collector.

TONG STREET LOCAL BOARD AND URBAN SANITARY AUTHORITY. Yorkshire. Collector: application, 11th September, to C. M. Wilson, Clerk, Bradford, Yorkshire, addressed to 'The Chairman of the Local Board.'

WAYLAND GUARDIANS AND RURAL SANITARY AUTHORITY. Norfolk. Clerk, etc. 65*l.* per ann., as Clerk to the Guardians, 20*l.* per ann. as Clerk to the Sanitary and School Attendance Committees, 20*l.* per ann. as Clerk to the Assessment Committee, and fees as Superintendent Registrar of Births, etc. Application, September 1, to E. Cubitt, Clerk, Bintry, near East Dereham.

SANITARY PATENTS.

2132. Improvements in apparatus used to regulate the supply of water to water-closets. John Pope, Folkestone, Kent.

2362. Improvements in the purification of gas and the utilisation of bye-products by the manufacture of secondary products therefrom. Roger William Wallace, Chemical Works, New Road, Battersea Park, Surrey; and Carl Friedrich Claus Great St. Helen's, London.

2428. An improved mode of and apparatus for purifying gas. John Clark, King's Cross; and William Clark, Clapton, Middlesex.

2446. Improvements in heating and ventilating buildings. Peter Jenson, Chancery Lane, London.—A communication from Peter Johann Elkman, Stockholm, Sweden.

2460. An improved method or means of heating or warming railway carriages, Pullman cars, or other vehicles used on railways or tramways. Henry Leak, Longton, Staffordshire.

ABSTRACTS OF SPECIFICATIONS.

4180. Apparatus for purifying and heating water. W. Boyes.

This consists of a closed vessel like a steam boiler, with (say) three flues; it is placed beside one or more boilers. The impure water is made to circulate through it and its flues, and is heated partly by products of combustion from the furnaces of the boilers, partly by the waste steam from high-pressure steam engines, or from drying cylinders or otherwise.

4203. Treatment of sewage. J. Watson.

Hydrochloric acid is used to precipitate the solid matters; and the precipitate may be used as manure.

4516. Purifying sewage and other foul waters. C. D. Abel.

From a first tank, in which some of the impurities settle, the water flows to a second and a third over weirs formed of horizontal bars of heavy wood with their ends in vertical grooves; a floating bar keeps back floating impurities. From the last tank the liquid goes into a filtering tank having drain pipes at the bottom with wicker fence on each side to retain a mass of gravel or, preferably, straw or coarse marsh hay. Charcoal may be placed first over the drain pipes. Chemicals may be put into the tanks to hasten precipitation.

NOTICE.

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Original Papers.

ON THE WATER-SUPPLY OF SEASIDE WATERING-PLACES.

BY G. W. WIGNER, F.C.S.

(*Continued from p.* 119.)

IN commencing a second paper on this subject it is right to mention that although some weeks often pass before the analysis of a sample is published, the analysis itself is always commenced immediately it is received, and followed up continuously.

HARWICH AND DOVERCOURT are partially supplied by means of an artesian well 400 ft. deep; the supply is insufficient for the requirements of the whole of the town, and therefore the best houses get a supply for eighteen hours per day, and the poorer houses for less. It is quite evident that the inhabitants are dissatisfied with the supply as water from one or two public pumps is taken round the town in carts and retailed at so much per gallon or per pail, and several houses are supplied from private wells. When we come to examine the results of the analysis it is not very difficult to discover a reason for the prevailing bad opinion. My sample was taken from a main pipe and the analysis showed:

	Grains per gallon.
Total solid matter	120·80
Loss on ignition after deducting combined carbonic acid	10·38
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	92·43
Hardness before boiling, 25° (Clark's scale)	
,, after boiling, 19° ,, ,,	
Nitrogen as ammonia	0·0693
,, albuminoid ammonia	0·0044
,, nitrates	0·4597
,, nitrites	0·0060
Total nitrogen in these four forms	0·5394
Oxygen absorbed by organic matter	0·0064

The water was quite turbid and milky from the presence of suspended matter which appeared to have a slight brownish tint. It was comparatively free from smell, but the briny taste of course overpowered all others. When microscopically examined it was apparently fairly free from organic matter. Looking at the whole of the results, however, it will be seen that the so-called water might almost as well be called brine. Nearly 100 grains of salt per gallon is such an excessive quantity that it is no wonder that the inhabitants prefer to buy water from public pumps rather than drink that supplied by the company. It is quite clear there must be an infiltration of sea-water in large quantity into the well, and the sooner the authorities see to this the better. In sending the particulars to me the authorities state that the supply is intermittent, amounting to about fifteen to twenty gallons per head per day, and that the consumers generally use filters, and further (and I certainly do not wonder at it), they say that a number of the inhabitants 'use and prefer filtered rain water.'

The next three analyses are specimens of the water supplied by public and private pumps in this place. There is a public one called the Barrack pump. It is said to have been there for many years, and to be supplied from a well thirty-six feet deep, and the water is taken round the town in carts and sold at so much per gallon. The analysis of my sample was as follows:

	Grains per gallon.
Total solid matter	61·40
Loss on ignition after deducting combined carbonic acid	14·44
Lead and copper—none.	
Iron—traces.	
Chlorine estimated as chloride of sodium	12·87
Hardness before boiling, 36° (Clark's scale)	
,, after boiling, 27° ,, ,,	
Nitrogen as ammonia	0·0064
,, albuminoid ammonia	0·0062
,, nitrates	1·7380
,, nitrites	0·0060
Total nitrogen in these four forms	1·7566
Oxygen absorbed by organic matter	0·0448

The water was of a very pale yellow colour, and had a slightly offensive smell; and when warmed a decidedly offensive taste. It contained traces of suspended matter. The microscopical examination showed the presence of a great deal of vegetable fibre, but no animal matter was detected; and when treated with a solution of sugar it did not show the peculiar cells generally indicative of drainage. Judging by the nitrogen present in the form of albuminoid ammonia and nitrates, this water is worse than the general supply; but a glance at the figures of the two analyses will show the reason why the townspeople in many cases prefer this to the water supplied by the company. Thirteen grains of salt per gallon is not sufficient to render the water objectionably saline to taste, but more than ninety grains decidedly is.

The water of another pump is supplied to a large number of the houses in two of the principal terraces in the town. The analysis of a sample of this is as follows:

	Grains per gallon.
Total solid matter	109·40
Loss on ignition after deducting combined carbonic acid	24·40
Lead and copper—none.	
Iron—none.	
Chlorine calculated as chloride of sodium	36·62
Hardness before boiling, 57° (Clark's scale)	
,, after boiling, 47° ,, ,,	
Nitrogen as ammonia	0·0044
,, albuminoid ammonia	0·0040
,, nitrates	1·5824
,, nitrites	0·0072
Total nitrogen in these four forms	1·5980
Oxygen absorbed by organic matter	0·0096

The water was of a very pale blue colour and comparatively free from smell, but it had a soapy and alkaline taste, and contained slight traces of suspended matter. The results of the microscopical examination were fairly satisfactory, but it will be seen from the figures of the analysis that the total mineral matter is excessive, and that the water is heavily charged with both common salt and lime compounds, and that it contains far more nitrates than ought to be present in a shallow well water. This, therefore, is another pump which should be at once closed.

The next sample is the water from a private pump supplying one or more good houses in the town. The analysis of my sample, which was taken in the presence of the occupier of the house where the pump is, shows the following results:

	Grains per gallon.
Total solid matter	81·30
Loss on ignition after deducting combined carbonic acid	20·46
Lead and copper—none.	
Iron—none.	
Chlorine calculated as chloride of sodium	20·385
Hardness before boiling, 30° (Clark's scale)	
,, after boiling, 24° ,, ,,	
Nitrogen as ammonia	0·0016
,, albuminoid ammonia	0·0035
,, nitrates	3·2120
,, nitrites	0·0050
Total nitrogen in these four forms	3·2221
Oxygen absorbed by organic matter	0·0032

In this case the water was of a pale blue colour and tolerably free from smell, although when heated there was a slight smell of urine perceptible; the taste was most objectionable, and the microscopical examination very far from satisfactory, unquestionably showing organic matter contamination. The amount of nitrogen as nitrates is so excessive that there can be no doubt that this water, like the last of which I spoke, has been heavily contaminated by drainage matter, even though oxidation has gone on freely, and the pump, which is fed from a shallow well, should be at once closed.

FELIXSTOW, the next place, is but very small at present, apparently having less than 1,000 inhabitants; it is reached from Harwich by a ferry. The water is reported to be drawn from natural springs in the adjacent hills, but it is not so good as might be expected from such a history. I obtained a sample from a main pipe, and the analysis is as follows:

	Grains per gallon.
Total solid matter	59·10
Loss on ignition after deducting combined carbonic acid	10·88
Lead and copper—none.	
Iron—heavy traces.	
Chlorine calculated as chloride of sodium	13·34
Hardness before boiling, 30° (Clark's scale)	
,, after boiling, 12° ,, ,,	
Nitrogen as ammonia	0·0009
,, albuminoid ammonia	0·0023
,, nitrates	1·9260
,, nitrites	0·0050
Total nitrogen in these four forms	1·9342
Oxygen absorbed by organic matter	·0032

The figures show that the saline and albuminoid ammonia are low, but the large proportion of nitrates and chlorides evidently indicate animal contamination of some kind on the gathering grounds from which the springs are fed. The microscopical examination showed the presence of much vegetable matter in the residue, but there were no clear indications of animal tissue which could be traced. The small proportion of oxygen absorbed by the organic matter is of course in favour of the water.

WALTON-ON-THE-NAZE has a resident population of some 1,000 or so, but a visiting population in excess of the proportions usually found at watering places. The water supplied by the water company is said to be derived from an artesian well, 400 feet deep; but strict orders had been given at the waterworks not to allow anyone to have a sample of the water, and difficulty was therefore experienced in obtaining authentic particulars as to the character of the supply. However, my assistant succeeded in obtaining a sample from a main pipe in the town, and when I consider the following figures I certainly am not surprised at the unwillingness of the company to allow a sample of the water to be taken. My analysis was as follows:

	Grains per gallon.
Total solid matter	228·80
Loss on ignition after deducting combined carbonic acid	3·68
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	182·87
Hardness before boiling 20·8° (Clark's scale)	
,, after boiling, 7·2° ,, ,,	
Nitrogen as ammonia	0·0020
,, albuminoid ammonia	0·0024
,, nitrates	0·7696
,, nitrites	0·0058
Total nitrogen in these four forms	0·7798
Oxygen absorbed by organic matter	0·1088

The water was free from offensive smell, but the taste was briny; the colour was fair, but there was enough suspended matter to render the appearance of the water cloudy. A microscopical examination of the suspended matter showed that it consisted mainly of earthy matters. Although, therefore, the water cannot be condemned as unfit for use on account of organic impurities, the above results show that it is insufficiently filtered, if indeed it is filtered at all, and that even if filtered it is so saline that it would produce thirst rather than quench it. The bore tube of the well, if it be artesian, evidently leaks. I ascertained that the company profess to supply this water for flushing purposes only, but of course such a statement as this must be taken for what it is worth. It is very seldom indeed that a water pipe would be brought into a house of the middle or lower classes, and the water not be used for drinking as well as other purposes; and even if it should happen that the family were so careful as to purchase water for drinking purposes, I am strongly of opinion that bad water is quite as injurious for boiling food in as it is for drinking.

I understand that the town authorities have applied for leave to borrow 7,000*l.* in order to obtain a better supply, and I hope they will soon receive the requisite permission, and then commence the work immediately.

After the above figures it will not be considered surprising that the proprietor of one of the largest hotels there, finding that his visitors dislike drinking brine, is obliged to use filtered rain water for drinking purposes; but there are other inhabitants of the town not so well situated, and they are obliged to purchase water by the pailfull or gallon from carts which take it round the town.

There are two pumps, known as Turpin's farm pump and Walford's farm pump, which are used in this way; the names are certainly suggestive, for there are few pumps to be found much worse than the general run of farm-yard pumps. Turpin's pump has the additional reputation of being near to a muck heap, and there is another pump still nearer to a muck heap, the water from which is said to be sometimes sold in the same way, but I could not get a sample from this latter pump. My analyses of samples from the other two pumps were:

	Turpin's Farm Pump. Grains per gallon.	Walford's Farm Pump. Grains per gallon.
Total solid matter	61·60	31·50
Loss on ignition after deducting combined carbonic acid	12·63	7·74
Lead and copper—none.		
Iron—heavy traces.		
Chlorine calculated as chloride of sodium	19·30	13·22
Hardness before boiling, Turpin's Farm Pump, 22°; Walford's Farm Pump, 14·0° (Clark's scale)		
Hardness after boiling, Turpin's Farm Pump, 13·2°; Walford's Farm Pump, 13·4° (Clark's scale)		
Nitrogen as ammonia	0·0016	0·0024
,, albuminoid ammonia	0·0076	0·0107
,, nitrates	2·1240	0·4550
,, nitrites	0·0080	0·0100
Total nitrogen in these four forms	2·1412	0·4781
Oxygen absorbed by organic matter.	0·0430	0·1184

Turpin's farm pump-water was very unsatisfactory in microscopical appearance; it contained numerous living organisms; it had a most offensive smell and taste, the latter being so marked, that there is no doubt it had received *recent* urinary contamination. Walford's farm pump-water had a more satisfactory appearance under the microscope, but the smell and taste were both unpleasant, though not so bad as to bear comparison with the last sample. The albuminoid ammonia is, however, much heavier. No water for public use or sale should ever be allowed to pass which has any offensive smell or taste. I place the utmost importance on this fact, because offensive smell and taste in waters are almost always caused by *recent* rather than remote drainage contamination, and the waters are therefore much more liable to sudden changes and variations in degree of impurity than waters which are free from taste or smell would be.

CLACTON-ON-SEA is a much smaller place than Walton-on-Naze. It has at present no waterworks, but there is a talk of some being formed. It is to be hoped it is not all talk, and that the works will be speedily begun and completed, for there can be no doubt that this lately formed seaside resort stands thoroughly in need of a better supply of water. The necessity of having it is shown not only by the character of the water at present used, but by the fact that the wells are all shallow, and as a probable result the water is liable to great variation. The sample, of which the following is the analysis, was drawn from a well only 8 feet deep, supplying one of the hotels, and this well was sunk because the water from another a short distance from it became so bad that the inmates of the hotel could not drink it:

	Grains per gallon.
Total solid matter	48·60
Loss on ignition after deducting combined carbonic acid	7·51
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	11·58
Hardness before boiling, 12·0° (Clark's scale)	
,, after boiling, 6·8° ,, ,,	
Nitrogen as ammonia	0·0024
,, albuminoid ammonia	0·0060
,, nitrates	1·0740
,, nitrites	0·0110
Total nitrogen in these four forms	1·0934
Oxygen absorbed by organic matter	0·1120

The colour of the water when viewed in a tube 2 feet long, was a dirty brown, almost opaque from the suspended matter present. The water itself had an offensive smell, and when warmed to blood heat, a most offensive taste; it was full of particles of suspended matter, and the microscope revealed the presence of numerous particles of decomposed muscular fibre and hairs. It is clear that this water, despite the comparatively low proportion of albuminoid ammonia it contains, must be condemned as quite unfit for use. I obtained another sample from a private pump belonging to a house in the town, the water from which *is considered* very good. This sample gave the following results:

	Grains per gallon.
Total solid matter	42·00
Loss on ignition after deducting combined carbonic acid	9·28
Lead and copper—none.	
Iron—heavy traces.	
Chlorine calculated as chloride of sodium	12·49
Hardness before boiling, 10·4° (Clark's scale)	
,, after boiling, 8·3° ,, ,,	
Nitrogen as ammonia	0·0044
,, albuminoid ammonia	0·0060
,, nitrates	1·1516
,, nitrites	0·0030
Total nitrogen in these four forms	1·1650
Oxygen absorbed by organic matter	0·0740

Although the chemical results of this sample are very similar to those of the last one reported on, except in the diminution of the nitrites, the results of the microscopical examination were more satisfactory. This water contained a very small quantity of sedimentary matter, its colour was pale blue, and the smell and taste were fairly satisfactory. It is evident that this well is open to the chance of contamination at any time. Nitrates in a shallow well are always signs of danger. Harwich and Walton are therefore the two worst supplies referred to in this paper, and the sooner the authorities replace the supplies of brine by supplies of pure water the better it will be. In the next paper I shall write of Brightlingsea, Southend, Sheerness, Herne Bay, and Westgate.

(*To be continued.*)

ERRATUM, August 24, p. 119.
Analysis of Lowestoft Water.
Oxygen absorbed, *read* 0·0600 *for* 0·600.

INFANT MORTALITY IN MACCLESFIELD.

THE town council of Macclesfield adopted a resolution on the 1st inst., appointing a committee to inquire fully into the causes of the excessive rate of infant mortality prevailing within the borough. This action on the part of the local sanitary authority not only reflects credit upon its members, but affords evidence that the terrible loss of infant life which is going on among so large a proportion of our urban populations may not much longer be allowed to continue unheeded and be considered as inevitable.

The question of the rate of infant mortality was brought before the Town Council by Mr. Alderman Wright in a well-considered and elaborate speech, which scarcely admitted any other alternative than

to grant the committee of investigation that he recommended. Local attention to the subject has been excited partly by the reports of the medical officer of health to the borough, and partly by remarks made by a local practitioner in the course of evidence given at an inquest recently held upon the body of a child who died from neglect, which remarks were fully endorsed by the coroner. Mr. Allwood, the practitioner in question, considered it his duty to 'make public the great amount of child-murder which was constantly taking place in Macclesfield;' and added that 'the people concerned were as guilty of murder as if they had simply cut their children's throats.' The coroner expressed his concurrence in all Mr. Allwood had said, and his belief that there was 'a great amount of child murder in Macclesfield,' and further that 'a dreadful state of immorality, with a frightful indifference to human life, existed in the town. It is not surprising that such opinions having been publicly and officially made, the town council were unanimous in deciding that the truth of the statements should be deliberately and thoroughly investigated.

Mr. Wright laid before the council a careful statement of the mortality statistics of the borough, which undoubtedly afford unsatisfactory evidence of its sanitary condition. For some years the death-rate from all causes, the death-rate from zymotic diseases, and the rate of infant mortality, have shown a constant excess. The main gist of his address had, however, reference to the mortality, and the alleged wholesale murder of infants; it is with this portion of the subject our intention alone to deal on the present occasion.

It is an unquestionable fact that during 1876 the deaths of infants under one year of age in Macclesfield exceeded the proportion of 200 per 1,000 of the births registered. When it is considered that the average proportion of infant mortality (measured in this manner) during the year, in twenty of the largest English towns did not exceed 166 per 1,000, and that even in Liverpool the rate of infant mortality was lower than in Macclesfield, it is fair to consider the excess of the death-rate among infants in the latter town as a fact beyond dispute. It is, moreover, reasonable to conclude that we may dismiss all idea of the prevalence of 'wholesale child murder' in Macclesfield, that is, in the literal sense of those words. It is undoubtedly difficult to draw the line between gross and wilful neglect of infants and their murder, but we prefer to consider that the town council has appointed a committee to inquire into the nature of the neglect which conduces to the excessive rate of infant mortality in Macclesfield.

Dr. Sutton (of Oldham) in his exhaustive paper upon the rate of infant mortality in England in 1875, carefully discussed the various rates which prevail in different localities and among different classes of society, and deliberately came to the conclusion that 'all infant mortality (during the first year of life) exceeding 100 per 1,000, or 10 per cent. of the births, is clearly excessive, and due to causes entirely within human control.' The Macclesfield rate in 1876 was more than double this standard. The case for an investigation may therefore be accepted as fully made out. There is, we fully believe, very little ground for believing that the neglect which causes this excessive death-rate differs to any considerable extent from the neglect which produces similar, though fortunately smaller, results in most other manufacturing towns. On this account the investigation in Macclesfield, if exhaustively carried out, will possess far more than local interest. It is but fair to admit that the rate of infant mortality in Macclesfield in 1876 was exceptionally high. This was owing to the fatal and epidemic prevalence of zymotic diseases, by which young children are the principal sufferers. During the first six months of 1877 the proportion of deaths under one year of age to births declined to 114 per 1,000, which was remarkably low for a manufacturing town.

Among the various causes to which Mr. Wright attributed the sacrifice of infant life in Macclesfield, may be mentioned—the high rate of illegitimacy, the neglect to provide medical assistance, the amount of irregular medical practice in the town, the facilities for infant assurance affording temptation for neglect, the small proportion of inquests held, and the incompleteness of those inquiries which were held.

We propose to refer briefly to a few facts bearing upon these proposed explanations of the high rate of infant mortality. During 1876 the proportion of illegitimate births registered in Macclesfield was equal to 8·6 per cent. of the total births, whereas the average proportion of illegitimate births in the whole of England and Wales is less than, and in Cheshire only slightly above, 5 per cent. We should here state that these facts relate to the three sub-districts of West and East Macclesfield and Sutton, which are taken by the Registrar-General to represent the borough; these three sub-districts include the two rural townships of Wildboarclough and Winde, which lie outside the borough, and exclude the township of Hurdsfield, which is municipal, but is situated in another registration sub-district. These differences of boundary, however, do not invalidate the figures as approximating very closely to those for the correct boundaries of the borough. Indeed, the proportion of illegitimate to total births within the correct boundaries of the borough, as given by Mr. Bland, the medical officer of health to the borough, is 8·8 per cent., the same as in the area taken by the Registrar-General. Within the area taken, the deaths under one year in 1876 were equal to 203 per 1,000 births; among the infants born in wedlock, however, the rate of mortality was 191, and among those born out of wedlock so high as 337 per 1,000. The mortality among illegitimate infants is usually twice as great as among the offspring of married women. The excess of infant mortality due to illegitimacy is therefore scarcely so high in Macclesfield as elsewhere.

With reference to the medical attendance of deceased persons in Macclesfield, we must confess to some astonishment at the result of an examination of the death-register. In 75·1 per cent. of the deaths registered in Macclesfield during 1876, the cause was duly certified by qualified and registered medical practitioners; in 3·7 per cent., inquests were held by the coroner; and in only 14 cases, or 1·2 per cent. of the deaths, was the cause uncertified either by a registered medical practitioner or by the coroner. This proportion of uncertified deaths is smaller than that which prevails in any other manufacturing town with which we are acquainted, and corresponds with the average proportion in London. It follows therefore that if gross neglect, or infanticide, prevail to any great extent in Macclesfield, it is either unsuspected or unexposed by the medical practitioners, and that even the coroner fails to discover it. The cause of the death of every illegitimate infant under

one year was duly certified, and in only nine cases were those of other infants under one year uncertified. It is evident therefore that there is but little unqualified medical practice going on in Macclesfield unless in alliance with registered practitioners who furnish the certificates. This form of alliance is, it is to be feared, not entirely unknown.

As regards infant insurance and its effect, if any, on infant mortality, there are unfortunately but few reliable facts upon which to form an opinion. Since the Friendly Societies Act of 1875, no money can be paid by any society except upon the certificate issued by the local registrar, and with regard to children under ten years of age, the Act limits the amount which can be paid upon such death. Registrars could therefore furnish returns as to the number of deaths of children whose lives have been insured. In order, however, to ascertain the rate of mortality among insured children, it would be necessary to know the number insured. Surely the State has a right to demand that all societies doing this dangerous business should furnish explicit annual returns showing the numbers insured, and the deaths that occur among the insured. It is stated that the medical officer of health of Macclesfield is now engaged in the investigation of this branch of the subject, although it is difficult to see how any satisfactory result can be arrived at unless the numbers insured were known. It is easy to see that a high rate of mortality among the insured is against the interest of friendly societies, but it is to be feared that the premiums charged are sufficiently high to cover an exceptionally heavy mortality.

Lastly, we would refer briefly to the proportion of inquest cases held in the town, and to the charge that inquiries before the coroner are not always attended with satisfactory results. The proportion of inquests held in Macclesfield during 1876 was equal to 3·7 per cent. of the total deaths, whereas the average proportion of inquests in the twenty largest English towns was 6·1 per cent.; the proportion in those twenty towns ranging from 2·6 per cent. in Sheffield to 8·0 per cent. in Manchester. Without intimate acquaintance with individual cases it is impossible to decide whether too few inquests are held in Macclesfield, although it is beyond question that the proportion is smaller than it is in most other large towns. If inquests had been held in each of the fourteen cases of death in which no medical certificate of the cause of death was produced (and it certainly appears desirable that inquests should be held in all such cases), the proportion of inquest cases in Macclesfield would scarcely have equalled the average proportion in the whole of England and Wales for the year. Mr. Bland, in his annual report, in referring to twenty-four instances in which the cause of death was either not stated or was ill-defined, remarks that the majority of those deaths have, after inquests, been entered in the death-registers as due to 'natural causes, suddenly.' In the death-register, however, these words are almost invariably followed by 'heart disease,' 'convulsions,' or some other cause of death, which are at least as definite as the causes inserted in many of the medical certificates. It is asserted that medical evidence is scarcely ever called at an inquest in Macclesfield, and if this be the case it is easy to see that the assigned causes of deaths, unless the result of violence, would have little definite value. The whole subject of coroners and their duties is in a certain sense now under national consideration, and it is but natural that satisfactory results should be expected from the expensive deliberations of a coroner and a jury. Above all it is desirable that confidence in the effect of this ancient institution should render it impossible to make such a charge of wholesale child-murder as has recently been made against Macclesfield by the local coroner himself, and by a local medical practitioner. That infant mortality is excessive in Macclesfield, as in most other towns, is evident, but that the neglect is of so exceptional character as to warrant this serious charge, there really appears to be no evidence to prove, and it is well to remember the fact that in 98·8 per cent. of the deaths in Macclesfield in 1876, the cause of death was duly certified either by registered medical practitioners or by the coroner, without any reference to this asserted wilful neglect; further, that of the deaths of infants under one year of age, all but 9, or 96·3 per cent., were so certified. Can this wilful neglect have occurred when the coroner and the medical practitioners make no reference to it in their certificates?

In conclusion, we completely agree with Mr. Wright in appealing to the ladies of Macclesfield to take up this matter of infant mortality. Dr. Sutton, in his pamphlet, to which we have before alluded, says, speaking of excessive infant mortality: 'This is essentially a woman's question, and in a great measure we must look to women for its solution;' and further adds, 'such a movement, however, must commence with the upper and middle classes, who if properly and systematically instructed in these matters would not only be infinitely better fitted to become mothers themselves, but would be able to render invaluable assistance and instruction to their poorer sisters.' Space will not permit us to refer to the practical suggestions made by Dr. Sutton for effecting this good work; it is scarcely necessary to say that he looks to the *crèche* or infant nursery to effect much in improving the health of infants, and in promoting a knowledge of the various essentials to the successful rearing of infants. The ignorance of mothers in Macclesfield may be inferred from the fact that of 570 women married in the district during 1876, no less than 234, or 41 per cent., signed the marriage register by mark.

We shall anticipate with much interest the result of the investigation which has been undertaken by the town council of Macclesfield, and could wish that other sanitary authorities would take up the subject in the same earnest spirit.

THE Liversedge Local Board and Urban Sanitary Authority, at their last meeting, passed the following resolutions:—'That, in the opinion of this board, it is desirable that the several local boards of North Bierley, Gomersal, Cleckheaton, Liversedge, and Heckmondwike should combine for the purpose of providing a main outfall sewer and sewerage works for their several districts, and that this board hereby expresses its willingness to enter into such combination.' 'That it is the opinion of this board that the combination of the several local boards of North Bierley, Gomersal, Cleckheaton, Liversedge, and Heckmondwike for providing a main outfall sewer and sewerage works can be best made under section 285 of the Public Health Act, 1875, and at considerably less cost and delay than under any other section.'

THE
SANITARY RECORD.
FRIDAY, AUGUST 31, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

SANITARY ADMINISTRATION.

I.

IT is a good sign that sanitary questions are once more beginning to occupy public attention in the daily press, for sanitarians have at last become awake to the fact that no argument less cogent than that of a general public agitation will induce the present administration even to attempt to redeem any portion of its pledges in this behalf. The conduct of the sanitary administration by the present Local Government Board has, indeed, throughout been the reverse of creditable. If they have not shown a degree of ignorance, indifference, and incapacity, such as no suburban vestry ever equalled, they have done something worse, viz., deliberately weighed the well-being of the population against the prospective votes of a few Hampshire nuisance-mongers, and determinately preferred the latter. The case against the Local Government Board is indeed overwhelming. The legislation of 1872 (Mr. Stansfeld's Act) was a distinct advance, although a very lame one, upon the state of things which previously existed. It was an advance, inasmuch as it created compulsorily an organisation for sanitary purposes in every district in England, but it was a very lame one, inasmuch as, in deference to the theories of a few crochety reformers, and still more to the prejudices of local obstructives, this organisation was left in an imperfect condition with a preponderance of motives to inaction, and with inadequate powers even when induced to act. The three years, or somewhat less, during which it continued in force were sufficient to show that it was inefficient for every single object of sanitary administration. It failed utterly to obtain for the population either good drainage, wholesome water, or healthy houses, while its measures for the purpose of checking the spread of epidemic disease became a positive by-word for inefficiency and incompetence. Accordingly, the new administration undertook, in 1875, to remedy this state of things, and by way of so doing passed the existing Sanitary Act—a piece of legislation which, while it has the one merit in the eyes of the lawyers of being comparatively easy of reference, has carefully re-enacted and, as it were, stereotyped every blunder, defect, and disability which existed in its predecessor. If this legislative blundering were all that could be laid to the charge of Mr. Sclater-Booth, he might have hoped to pass unnoticed as one among the many incapable officials whom the exigencies of party-politics occasionally thrust into posts of importance, but it is very far from being all. His administration has been far worse than his legislation. Not content with leaving the intelligent minority of a local board at the mercy of the ignorant and interested obstructives by declining, on all occasions, to exercise that pressure in the direction of improvement which the Act places within the power and duty of the board over which he presides, he has systematically discouraged the efforts of health officers, neglected their reports, disregarded their representations, and, to the utmost of his power, has counteracted the provision made by Mr. Stansfeld for their comparative independence of mere local influence by subjecting them to periodical re-election. In addition to all this, he has habitually snubbed deputations from the bodies best acquainted with the sanitary requirements of the country when they have tried to urge upon him the removal of some glaring defect in the law, and has succeeded in impressing sanitary reformers generally with the conviction that, if he knows but little of the work of his department, he cares less, and that his sympathies are all on the side of their nuisance-mongering opponents. It would be hard to decide whether incapacity or dishonesty have had the larger share in the sanitary administration of a government which came into office with the cry, 'Sanitas sanitatum omnia sanitas.' Philanthropy and science are of no political party, but we sincerely hope that, when the next election takes place, sanitarians will not forget the shortcomings, and worse than shortcomings, of Lord Beaconsfield's Local Government Board.

THE HEALTH OF HARROGATE.

IN the Registrar-General's last quarterly return of the mortality statistics of our principal seaside and inland health and holiday resorts, Harrogate earned the unenviable notoriety of showing the highest death-rate from all causes among the inland watering-places, and a zymotic death-rate only second to that in Bath, which suffered from an exceptionally fatal epidemic of measles. The sanitary reputation of Harrogate acquires additional interest from the notorious conduct of the local sanitary authority towards their medical officer of health, Dr. Deville, the effect of which has been that, for about eighteen months, the local board district of Harrogate has been practically without the services of a professional adviser on health matters. Without for one moment attempting to attribute the present unfavourable mortality statistics to the ill-judged treatment of their health officer by the Harrogate sanitary authority, it is only too evident that the town has in fact been deprived of the services of

this official at a time when the preservation of its health reputation especially calls for them.

In a recent leader in the *Times*, the evidence of unsatisfactory sanitary condition afforded by the Registrar-General's mortality statistics for Harrogate was very forcibly dealt with, so forcibly, indeed, as to call forth an almost indignant protest on the part of Dr. Myrtle, a local practitioner in Harrogate. The main gist of his assertion is that Harrogate is, the Registrar-General's figures notwithstanding, one of the very healthiest of health resorts; and the ground on which he bases his appeal to the public to disregard the unfavourable mortality statistics is that the Registrar-General's figures relate to an area which includes a rural area in addition to Harrogate proper. If we would believe the special pleaders on behalf of watering places, there is a singular dispensation with regard to these urban aggregations, which causes the death-rate of the surrounding rural population frequently to exceed that which prevails in the towns themselves. It is needless to say that this is not only generally improbable, but is contrary to the experience of the rates of mortality which usually prevail around other towns.

Dr. Myrtle tells us that Harrogate is 'thoroughly drained, furnished with a superabundant supply of the very purest drinking water, and is blessed with an air as bracing and respirable as many of our Highland districts.' All this may be, and probably is true, without a high death-rate being impossible. The area taken by the Registrar-General to represent Harrogate includes, says Dr. Myrtle, 'Harrogate proper *plus* some square miles studded with hamlets and villages by no means remarkable for their sanitary conditions.' Dr. Myrtle further asserts 'the death-rate of Harrogate, I find from the returns of the district registrar, is under 18 per 1,000,' whereas the Registrar-General gives the rate for the area taken as 22·8 per 1,000. In order for this to be true, it would be necessary for the death-rate in the small rural portion of the population of the sub-district to be extraordinarily high. Now as regards the desirability of Harrogate as a health resort, it really matters little whether the high death-rate and the prevalence of zymotic disease prevail within the arbitrary boundaries of the town itself, or in the immediately surrounding rural zone. We must confess, however, that the statistical interest of this constant assertion that the health reputation of watering places suffers from the unsanitary condition of their rural surroundings, partly prompted an appeal to the source of Dr. Myrtle's information, namely the local death register in order to test the accuracy of his improbable assertions.

The Local Board District of Harrogate is almost entirely situated within the registration sub-district of the same name, and consists of part of the township of Bilton with Harrogate, part of the parish of Pannal, and a very small part of Knaresborough township. Now the description of the place of death in the death register is not sufficiently accurate (especially in inquest cases) to distinguish the deaths that occur within the arbitrary boundaries of the local board district. We are bound, therefore, to fall back upon the area of the entire township of Bilton with Harrogate, and the entire parish of Pannal (each including a certain rural area), which had a population of 8,668 in 1871, of which nearly 80 per cent. lived within the Improvement district. Assuming that the rate of increase of population which prevailed between 1861 and 1871 has since been maintained, it may be estimated that the population of these two parishes in the middle of this year is 10,742. The sixty deaths registered therein during the three months ending June were equal to an annual rate of 22·4 per 1,000, or with the addition of four workhouse deaths registered out of the two parishes, to 23·9 per 1,000, a rate exceeding by one per 1,000 that published by the Registrar-general for the entire sub-district. Dr. Myrtle gives the Harrogate rate as under 18 per 1,000! Now in the six entirely rural townships which Dr. Myrtle describes as 'studded with hamlets and villages by no means remarkable for their sanitary condition,' only seven deaths were registered during the quarter, equal to an annual rate of only 15·9 per 1,000. This is just what might be expected in a purely rural Yorkshire population, but singularly different from what Dr. Myrtle would have us believe.

The zymotic death-rate of a health resort possesses far more real interest for the visitor than does the death-rate from all causes. Within the registration sub-district of Harrogate one death from measles, four from scarlet fever, two from diphtheria, one from whooping-cough, and three from diarrhœa, were registered during the quarter under notice. Although Dr. Myrtle did not distinctly say so, his letter undoubtedly inferred that the fair reputation of Harrogate had been sullied by having attributed to it the results of the insanitary condition of surrounding hamlets and villages. We were therefore prepared to find that the majority, if not all of these eleven deaths from zymotic diseases, really occurred among the rural population around Harrogate proper. It is a simple fact, however, that every one of these eleven deaths occurred in the two parishes within which the Harrogate urban sanitary district stands; they were equal to an annual zymotic rate of 4·1 per 1,000 of the estimated population. Not a single zymotic death occurred in the six rural townships of the sub-district, which Dr. Myrtle boldly attempted to saddle with the high rate of mortality from all causes, and from zymotic diseases, the reporting of which by the Registrar-General, and the remarks thereon by the *Times* and other papers, Dr. Myrtle considered so unfair to the health reputation of Harrogate.

If Dr. Myrtle has the true interest of Harrogate at heart, we would suggest that no good will result from trying to throw dust in the eyes of the public

and of the ratepayers of Harrogate. If he can influence the local sanitary authority to adopt a new and a completely changed health policy, he will be rendering far more valuable assistance in restoring public confidence in the sanitary condition of Harrogate, which possesses natural advantages sufficient to render it with little difficulty a model health resort.

Notes of the Week.

A PUBLIC park has recently been opened at Limerick.

THE recently constructed urban sanitary authority of East Dereham, Norfolk, have appointed Mr. Nankerville as their surveyor and inspector of nuisances.

PLANS prepared by Mr. Hawkesley for waterworks for Wexford have been approved of by the town council of that borough, and will be carried out forthwith.

A DRINKING fountain is to be erected on the green at Shipton-under-Wychwood, as a memorial of the fourteen emigrants to New Zealand from the village, who lost their lives by the burning of the *Cospatrick*.

THE local board of health for Willesden, N.W., has referred to a special committee to consider and report as to whether it is desirable or otherwise to take steps for the erection of permanent offices for the board.

PLANS and sections for the drainage of Kingskerswell, prepared by Mr. James Stooke, land surveyor, Newton, have been approved by the rural sanitary authority, and ordered to be sent to the Local Government Board.

THE Local Government Board have refused to sanction the reappointment of Dr. William G. Forbes as medical-officer of health for the Stokesley rural sanitary district at 40*l.* per annum, as that amount is inadequate for the services required.

A COMMUNICATION has been received from the Local Government Board ordering the Farnworth local board to proceed with the works for dealing with the workhouse sewage within a certain time, and stating that in case of default being made, a compulsory order will be at once issued.

IT has been positively decided by the Romford local board of health to decline the renewal of their contract with the Romford Gas Company for the lighting of the public lamps, and preparations are being made for lighting the town with petroleum. It is anticipated that the new oil lamps will be ready for use in the second week of September, and that a saving of 100*l.* per annum will be effected by the change from gas to petroleum.

THE commencement of another great public improvement in St. Pancras has just been inaugurated by Mr. Charles Greenwood, chairman of the finance committee of St. Pancras Vestry, formally taking possession of the ground at the junction of Gordon House Lane with Highgate Road, which has been purchased by the vestry for the purpose of widening the lane. It is expected that the widened road will be thrown open for traffic at the beginning of next month, and it will then connect for the purposes of traffic the east and west divisions of the northern parts of the parish.

ACCORDING to returns furnished by the engineers of the Metropolitan Board of Works, the average daily quantity of sewage pumped into the river Thames during last week was 268,839 cubic metres at Crossness, and 369,863 cubic metres at Barking, equivalent to about as many tons in weight.

THE Sevenoaks local board at their last (a special) meeting, after a letter from the secretary to the waterworks company had been read and discussed, passed the following resolution: 'That a provisional contract be entered into between the local board and the waterworks company, for the purchase of the waterworks, subject to confirmation by the Local Government Board, and by the shareholders of the waterworks, the price to be fixed by valuers appointed on either side, with an arbitrator in case of need.'

TYPHOID FEVER AT BEDALE.

THE outbreak of typhoid fever at Bedale, Yorkshire, is, we are assured, dying out; no fresh cases have occurred since the 17th inst., and the cases yet remaining on the list are progressing favourably. We learn that at the request of the sanitary authority, the Local Government Board are about to send down their medical inspector, Mr. Power, to make inquiry into the cause of the fever, and to advise the Board as to the best means of improving the sanitary condition of the town.

THE LIERNUR SEWERAGE SYSTEM.

THE Commission of Advice to the Amsterdam Town Council having unanimously recommended the extension of this system to an area equal in extent to half of the town, and chiefly consisting of the new and fashionable quarters, the council have, without a division, voted the first instalment of the extension, a length of mains of about two miles, at an estimated cost of about 90,000 florins.

HACKNEY EXPRESS INDEMNITY FUND.

A MEETING has been held in the council chamber of the Shoreditch townhall for the purpose of presenting to the proprietor of the *Hackney Express*, Mr. Joseph Cox, the fund which has been subscribed to indemnify him against the costs incurred in the late action for libel in connection with certain buildings at Hackney Wick. Mr. W. H. Fell, one of the representatives of Shoreditch at the Metropolitan Board, presided. Mr. Cox was complimented on all sides for the manner in which he conducted his paper, and the chairman presented to him a cheque for 302*l.* 4*s.*, the amount of the subscriptions, which will probably cover all the costs of his public-spirited attempt to improve the mode of building small houses in his neighbourhood.

CAMPDEN RESERVOIR.

WE read in a contemporary that a committee of the Kensington Vestry has been appointed to examine the large reservoir situated at Campden Hill, it being reported to be in a somewhat dangerous state, largely leaking, and requiring to be frequently strengthened with new buttresses. This is a very wise step to take, for were it to burst, there would, owing to the closely inhabited neighbourhood, be a dire destruction of life and property. In all probability the evil wrought by the Bury and Holmfirth accidents would be fearfully exceeded. It is a pity that we are compelled to have so many of these reservoirs in the metropolis, and are not supplied from one general conduit. The sooner that the sites of most of these reservoirs and filtering grounds are thrown open for recreative or other purposes the better. At the present moment we learn that owing to the bursting of one of the Kingston reservoirs, parts of Pimlico, Chelsea, and Westminster are greatly incommoded for want of water, and this very fact strengthens the conclusion to which we have come.

SEAMEN AND SMALL-POX.

THE Port Sanitary Committee of the Corporation of London have recently issued an additional notice recommending 'as a precautionary measure' that as long as the epidemic exists all seamen should be medically examined, in accordance with the provisions of section 10, Merchant Shipping Act, 1867. This section is permissive only. It is believed, however, that if some of the cases found afloat affected with small-pox had been examined at the time of signing articles the disease would have been discovered.

THE ADULTERATION OF SODA WATER.

Mr. E. SERGEANT, medical officer of health to the borough of Bolton, in his last monthly report to his authorities, states that he found the soda water largely contaminated with lead, and containing a considerable quantity of floating animal particles. There was no prosecutor in this case, as it was the first of its kind, and the maker was evidently ignorant of the condition of the soda water. Mr. Sergeant takes the opportunity of cautioning aerated water-makers to be more careful in eliminating the possibility of lead contamination by due attention to the 'washers,' gas generator, piping, etc. Also, a greater purity of water might be attained. Mr. Sergeant proposes to direct earnest attention to this subject, as he considers it to be of the highest importance that soda water—a drink so extensively used, and which frequently has to play such a prominent part in the treatment of disease—should be of the greatest purity.

THE SANITARY CONDITION OF THE RUSSIAN CAMPS.

ONE of the *Times'* war correspondents, speaking of the want of ordinary sanitary precautions in the Russian camps, says, 'The head-quarters of the Emperor himself at Biela afford an example of what may be understood by the English word "nuisances," such as would not be permitted in the dirtiest village in Great Britain, to say nothing of that perfect model of all that is careful and sensible—an English camp. A stream runs through Biela, close to the house where the Emperor now lives, and a fence surrounds the yard and garden. Against that fence is heaped the filth of humanity, and in the stream was lying the other day the half-decayed carcase of a dead horse. No wonder that General Ignatieff was suffering from fever. Who, indeed, will escape it? But it is not only the present danger of fever and diarrhœa which is to be dreaded, it is rather the instant spread of those diseases which are known to float in minute particles distributed through the air and the water. If any one of these—say cholera—makes its appearance, the chances of the Russian army will be bad indeed.'

DANGEROUS STEPS.

PUBLIC attention has been lately called to the danger which foot passengers incur when using the steps which lead down from Waterloo Bridge (Strand side) to the Embankment, the steps being very steep, and so smooth and slippery, that accidents are often very imminent. Very recently a well-known member of the Press was coming down them, when, upon getting on to the first landing, he slipped and fell to the bottom, striking his head on one of the steps as he fell. The unfortunate gentleman died at Charing Cross Hospital shortly after the accident. The same kind of stone as that which forms the steps at Waterloo Bridge is also used for the footways over the bridge, and at London Bridge also. Cannot some one, it is suggested, having a practical knowledge of stone footway masonry, point out some practical remedy for the present danger of walking over the much-used bridges before named? Would not 'roughing' the stones be something of the kind of thing needed to prevent such lamentable accidents?

We fear 'roughing' the stones, however well it might act in summer, would intensify the danger in winter, when the moisture in the rakings was frozen. We fear also that granite is not a proper material to 'rough,' and neither was it a proper substance to employ for steps so much in use. The felspathic crystals are very large, and soon become smooth as glass. Had these steps been made of a suitable stone (York, for example), they might have shown more signs of wear, but then they would be much less dangerous. The only cure would be to rebate them out and lay in pieces of gritty or sandy sedimentary rock, and not of plutonic.

THE LONDON WATER-SUPPLY.

AT a recent meeting of the Lambeth vestry complaints were made as to the quality of the water supplied by the Southwark and Vauxhall Company, and special allusion was made to Dr. Frankland's report as to 'moving organisms' in that water. The medical officer was thereupon instructed to make a report, and this report he submitted to the vestry last week. He states that it must not be inferred that the water is teeming with insect life visible to the naked eye, and he asserts that water taken from the Lambeth mains is not in such a condition. At the same time, if a quantity of water be set aside and allowed to deposit its suspended matter, and some of this be placed under the microscope, low forms of organic life are plainly visible, most of these forms being so minute as to defy the finest filter. Their presence is significant, as being indicative of organic impurity, for without this they could neither be developed nor sustained. So long as the water-supply is taken from the Thames we shall ever be open, at certain seasons, to inconveniences which no amount of precaution can prevent—viz., by the winter floods rendering it turbid and undrinkable, and by the development of these microscopic organisms in the summer time. On the other hand, the Thames water, when pure, is so suitable for all purposes, that if it were possible to rid it of its organic impurity and to insure its perfect filtration, we should have water even preferable in some respects to that coming from the Kent and Colne Valley. But it must be borne in mind that with a rapidly increasing population there will be a proportionately increased demand, so that the possibility of ever getting purer water from the Thames seems problematical. At certain times the demand is so great that there is not sufficient time to admit of subsidence and filtration before delivery. Large additional reservoirs for subsidence are needed to improve the quality of the water. Little advantage would accrue from seeking a water-supply purer than the present if the plan of storing water in cisterns placed in the most exposed and inaccessible situations were still adhered to. What is really needed is a separate supply of water for drinking and culinary purposes. While our drinking water is drawn from the same source which supplies our baths, washhouses, and so forth, the wonder is that the water is so pure. It was decided to defer the discussion of the report, Mr. Fowler intimating that he hoped shortly to be able to submit to the vestry a report made by the Metropolitan Board of Works with respect to purchasing the water companies' undertakings.

BY-LAWS ISSUED BY THE LOCAL GOVERNMENT BOARD.—No. 2.

THIS section of the Act was passed for the prevention of nuisances arising from snow, filth, dust, ashes, and rubbish, as well for preventing animals kept on any premises being injurious to health, and under it the local sanitary authorities can make by-laws. The section is the 44th of the Public Health Act. The first by-law refers to removal of snow from the footpath in such a manner as not to cause any undue accumulation in the channel or carriage-way, and if salt be used on the footway, the whole shall be forthwith effectually removed; that no dust, ashes, filth, etc., shall be placed or spilt on a public thoroughfare, and if deposited in a receptacle provided by the sanitary authority, shall be moved in a covered vehicle or

vessel, and if any be spilt it shall be forthwith taken away. The 7th is to the effect that if any dust, ashes, etc., be collected from the district and deposited on a wharf or other place for removal, it shall not remain longer than —— hours if within —— yards of a street, house, or building used as a public resort; and by the 9th, no farmer shall allow night-soil or similar offensive matter to remain on the ground if within —— yards of a building unless properly deodorised or covered over. There are provisions also for preventing the keeping of pigs or cattle, or depositing their dung within a certain distance from a well which is likely to be used for any other than agricultural purposes; and the occupier of the premises whereon the animals are kept shall provide a proper covered dung-pit for the reception of the dung, the floor of the pit not being lower than the surface of the adjoining ground, and the pit being constructed of such materials as shall prevent the soakage of the contents into the ground or into the wall of an adjoining building. He shall also provide drains for the conveyance of the urine or liquid filth from the premises into a sewer, cesspool, or other proper receptacle, which shall be emptied at least once a week. There is also a by-law for imposing penalties on all persons who may offend against any of these regulations.

These by-laws, if adopted by local sanitary authorities, would prevent much injury to health, as the keeping of heaps of decomposing vegetable matter, night-soil, and other offensive matters on the ground near to inhabited houses, is a comparatively common practice amongst farmers in many parts of the country, and doubtless contributes to the spreading of infectious diseases. The precautions to be taken against the fouling of water by the excreta of animals are of greater importance, as many cases of typhoid fever and of severe diarrhœa have been assigned to this cause. But as the 44th section is permissive only, we fear that comparatively few local authorities will make such by-laws, public opinion in the country being as yet scarcely advanced enough to support the guardians or other sanitary authorities in taking the necessary action.

HEALTH OF WATERING-PLACES.—LLANDUDNO.

DR. JAMES NICHOL, late medical officer of health for Llandudno, has addressed a letter to the *Times*, with a view to show that as regards that watering-place the Registrar-General's recently published report is 'incorrect and unfair, and therefore utterly worthless for the purpose it is intended to serve.' This is strong language and it is desirable to ascertain how far this complaint is justified by the facts of the case. The Registrar-General in his watering-place table only professes to give statistics for the registration sub-district in which Llandudno is situated, and reports that during the three months ending June last the annual death-rate from all causes was equal to 26·5 per 1,000, and from the seven principal zymotic diseases to 2·8 per 1,000 persons estimated to be living. Reference to the death-register proves that these are simple facts, and in his remarks on the table the Registrar-General states that the death-rate was '27 in Creuddyn (of which Llandudno is a part.)' The charge of incorrectness, therefore, cannot be maintained, and it is only in case these figures are misquoted and applied to Llandudno proper that any unfair impression can be conveyed as regards its recent health. Now the object of this table is mainly to guide the public in the choice of a watering-place by information as to recent prevalence of epidemic disease in or around the various English health and holiday resorts; and the danger to visitors is nearly the same in these small watering-places whether zymotic disease prevail immediately around or within the arbitrary boundaries of the places themselves. The comparatively high death-rates which have prevailed in and around both Llandudno and Rhyl from time to time have before now been discussed in these columns, the rates of infant mortality being exceptionally high for selected health resorts. On the present occasion it should be pointed out that the zymotic death-rate of 2·8 per 1,000 during last quarter in Creuddyn sub-district, was not due to measles, as was asserted by Dr. Nichol, but to scarlet fever. This disease had fatally prevailed in Conway for some months; and during the three months under notice five deaths were referred thereto in the sub-district of Creuddyn. It is true that not one of the five fatal cases occurred within the arbitrary boundaries of Llandudno; but two occurred during April in Llangystenyn and at Towyn, and during June two were registered at Llansantffraid, and one at the unpronounceable place Ddwyffordd in Llandrillo parish. Now it appears evident that scarlet fever was during the second quarter of this year somewhat prevalent in the parishes around Llandudno, the disease having probably spread from Conway and Bangor, where it had been more or less epidemic. Now if the figures had only been given for the small boundaries of Llandudno, no warning would have been given of the prevalence of scarlet fever in its vicinity, a fact all the more important to intending visitors, because we believe that the sanitary authority of Llandudno has not yet provided any hospital accommodation for the isolation of cases of infectious disease, to the importation of which the town appears to be liable from the unsatisfactory sanitary condition of the surrounding districts. The restricted areas of so many of our sanitary districts creates much difficulty in the way of successful sanitation.

SANITATION AT HEREFORD.

DR. H. V. SANDFORD, who has recently been elected medical officer of health to the Hereford Urban Sanitary District, for life, has lately recommended the Mayor and Burgesses of Hereford to consider the desirability of making a by-law to the effect that the owner or occupier of every house within the city having a water-closet attached to the sewers, shall be compelled to have a ventilating shaft or pipe fixed three or four inches below the pan to the soil pipe and carried outside, and, if possible, above the roof of the house. Dr. Sandford also recommends that instead of the handle of the plug being fixed in the seat of the W.C., the same plug shall be pulled up by means of a crank fixed to the ceiling, and to it a cord and handle, so that the user may pull such handle down, standing in an upright position with his back to the pan, instead of as now, drawing the handle up, with the head bending over the pan during the flushing, thus compelling him to inhale the most deadly gases all the time the necessary water is allowed to flush and wash out the pan. Dr. Sandford also suggests that every drain from the inside of a house, coming from kitchen, washhouse, pantry, whatsoever and wheresoever situated, being attached directly to the main sewer, shall instead be cut off and disconnected, and that over the end of the portion of pipe attached to the sewer a 'D' trap shall be placed of sufficient capacity to resist the gases escaping from the main sewer. This 'D' trap ought to be placed in the yard or garden outside the house close to the foundation wall, and to it all pipes from the said washhouse, kitchen, pantry, slop-stone, etc., ought to be brought to the 'D' trap, and made to empty into the grid over such trap outside the house—thus entirely cutting off the house from the sewer. This plan he has found to be the only effectual means of preventing these invisible but living germs from entering a dwelling, while to its other recommendations may be added its simplicity and cheapness. In order to make all clean and tidy, a small perforated wood or zinc box might be placed over the trap and mouths of the pipes, which can be made to open when required to clean out the grid and trap, and in addition any disinfecting or deodorising material can be placed in the trap without the gases emanating therefrom entering the dwelling. He has tried the plan now for four years with the greatest success, and it has been recognised by the leading engineers and medical officers of health

assembled in London a short time ago as the only simple and available means hitherto known of preventing deadly germs from sewers entering a dwelling. It is a plan also which is quite as applicable to pipes attached to cesspools as it is to sewers.

In the short discussion which followed the reading of this report, Mr. Shellard, one of the board, as a house and estate agent well acquainted with the neighbourhood, said that it would require to be incontestably proved that a necessity for such ventilation existed before making any by-laws upon the subject. He further said that if they made the recommendations compulsory, they 'would inflict considerable expense upon small owners, and, as some would think, quite unnecessarily.' He somewhat ridiculed also the idea of a downward pull flushing.

We agree with Dr. Sandford, and are sorry to disagree with the town councillor. The escape of foul gas from a single pan during one moment of flushing, might amount to at least 100 cubic feet; and if, as we understand, the main drains of Hereford are only flushed out twice a week, there can be no doubt that the medical officer's suggestion is a wise one. We believe the time will come, and that before long, when closet pans will be flushed out automatically by compulsion; and Dr. Sandford might have added a clause connecting the ceiling crank with the closet door. Either that or a flushing effected when rising after the moments of voidance. It is as well to listen carefully and take some little time to consider the report of a medical officer of health, and not attempt to talk it down when the 'eye has just lighted' on a portion of it, which professes to speak of sanitary improvement, and must have cost the writer much professional thought. Mr. Gwynne James, Mr. Alderman Bosley, and Mr. Vaughan agreed with Dr. Sandford as to the desirability of severing the house drains from the sewer by a ventilated trap, and after a little more discussion the report was adopted.

Special Reports.

SCARLET FEVER IN GREAT MASSINGHAM.

THE following is a report by Dr. Thorne Thorne, the local government inspector, to the Local Government Board, on the circumstances attending an extensive diffusion of scarlet fever in Great Massingham and other villages in the Freebridge Lynn Rural Sanitary District, and on certain points relating to the sanitary administration of the district:—

'The village of great Massingham, in the Freebridge Lynn Union, in Norfolk, is situated about 13 miles east of King's Lynn. It occupies an exposed and elevated site in a slight basin having an outlet to the east. The soil is stated to consist of sand and gravel to a depth of about 10ft. to 15 ft., beneath which is boulder clay overlying chalk. The houses are scattered round numerous open spaces. These spaces are to a great extent occupied by shallow sheets of water, which, besides causing nuisance at times owing to the sewage they receive, must greatly add to the natural dampness of the site. The population, which is mainly agricultural, numbered 887 in 1871. In many respects the sanitary circumstances in Great Massingham are unsatisfactory in the extreme. Though the water-supply is derived in part from several deep wells which are sunk in the chalk, and which are stated to be so constructed as to prevent soakage into them from the surface soil, it is also to a not inconsiderable extent derived from shallow wells in the sand and gravel. These latter wells are in several instances so situated that they must run constant risk of being fouled by surface soakage, and, in one instance, one of them, which is largely resorted to, is situated in dangerous proximity to one of the sheets of pools of water which receives sewage. Here and there some provision has been made for drainage in the village, but the liquid refuse is in these cases almost invariably conveyed to the pools. In many instances, however, there is no drainage provision, and the slops and liquid filth are in consequence thrown either into privy pits, or into open receptacles for ashes and refuse, or still more frequently on to the ground around the houses. Some of the yards were, owing to this cause, in an indescribably filthy condition, being in parts quite flooded with filth. Common privies form the general means for the disposal of excrement, but they are very deficient in number, as many as from three to six cottages having in several instances but one privy between them. The pits in connection with them are sunk in the porous surface soil, into which their contents soak. Many of the privies are the source of great nuisance. Some are filthy and dilapidated, and the contents of one was found to soak into the cottage against which it was built. More than one were quite unapproachable owing to the filth surrounding them, and from this cause several households have been compelled for months past to do without any form of closet whatever, owing to circumstances to which I shall refer. But little trustworthy information could be procured as to the past sanitary history of Great Massingham, and an examination of the death-registers afforded no assistance in this respect, for until 1875 (when the provisions of the Act to Amend the Law relating to the Registration of Births and Deaths in England came into operation) the causes of death were but rarely certified. Thus, out of a total of sixty-five deaths registered in the five years 1870–74, the cause of death was only certified in two instances. Certain groups of cases of 'low fever,' probably enteric fever, were heard of as having occurred some few years back, but there had been no recent cases of this type. In the autumn of 1874, however, scarlet fever became epidemic in the village, the number of cases up to the end of the following March being variously estimated at from 100 to 200. The attacks were, however, of a comparatively mild type, and only three of them appear to have terminated fatally. Early in 1876 occasional cases occurred in the village of Grimstone about five miles west of Great Massingham, in the highway to King's Lynn. Since that date, Grimstone has never for any length of time been free from scarlet fever, and early in December last that disease became widely spread throughout the village, about fifty cases and three deaths occurring. At the present time it appears to have subsided there. But about the same date that the disease became epidemic in Grimstone, scarlet fever re-appeared in Great Massingham, and there it has again attacked at least 100 persons. This second epidemic in the village appears to have been of a very mild type, and no death is certified as having been caused by it. Minor outbreaks of the same disease have also occurred in several other parts of the Freebridge Lynn rural sanitary district during the present year. Thus in South Wootton there were fifteen cases and one death; in Roydon there were several cases, one of which ended fatally; and in Gayton there was also a small outbreak. About twenty cases occurred in the urban sanitary district of King's Lynn, with which place the infected portions of the Freebridge Lynn district were in unrestricted communication. In June, 1873, the rural sanitary authority of the Freebridge Lynn Union appointed a medical officer of health for their entire district, at an annual salary of 100*l*., and also an inspector of nuisances at the same salary. Both appointments were made for one year, and the inspector of nuisances was required to devote his whole time to the duties of his office. During the year ended June, 1874, the medical officer of health was supplied with information as to the existence of cases of infectious disease in the district, both by means of the returns of the poor law medical officers with which he was duly provided, and by means of voluntary assistance afforded him in this matter by private medical practitioners. Every case which came under his notice was immediately visited by him, and measures were, with the assistance of the inspector of nuisances, at once taken with a view of staying the spread of the disease. These measures are stated to

have included certain means of disinfection, such isolation as could be procured, and in at least one instance speedy burial of the dead. The inspector of nuisances appears also to have been diligent in the performance of his duties; indeed, the sanitary authority, in a communication addressed to the Local Government Board in May, 1874, with regard to the officers referred to, state that 'comparatively few nuisances remain in existence after the active measures taken and the work completed during the past 11 months.' In June, 1873, the Sanitary Authority, however, determined not to renew these appointments. The medical man who had been medical officer of health was requested to retain the title, but the terms of his appointment were such as to debar him from performing the duties properly belonging to the office, for he was only to act when 'specially called in,' and for each such separate service he was to receive a special fee. The two relieving officers were at the same time appointed to act as inspectors of nuisances. Judging from the circumstances which I ascertained during my inspection, it is evident that from this moment the sanitary administration of the Freebridge Union became characterised by neglect of the gravest description. The medical man holding the office of medical officer of health was not called upon to act in any case until December, 1874, when he was requested to visit Great Massingham on account of the first of the two epidemics of scarlet fever, to which reference has been made. He then reported that scarlet fever had been widely epidemic there for some months past, and that it had also broken out in Little Massingham. Isolation being at that stage of the epidemic, in his opinion, not only useless, but impracticable, he limited himself to making certain recommendations as to disinfection; but he at the same time pointed out to the sanitary authority the uselessness of such a visit as he had been instructed to make, adding that, 'the way to stop preventable disease is to attack the first case, and not to wait till the whole village is ravaged before steps are taken to arrest it.' According to the report-book of the inspector of nuisances for that portion of the district in which Great Massingham is situated, it appears that during December, 1874, and January, 1875, this officer in four instances advised that infected clothing in Great Massingham should be disinfected. But in the absence of the advice and supervision of a medical officer of health, he did not know how such disinfection was to be carried out, and the consequence is that none was attempted. At last the epidemic subsided, and on the authority receiving information to that effect they, on February 14, instructed the medical officer of health to visit Great Massingham a second time, in order, according to a communication which they addressed to the Local Government Board, 'to report if danger of infection' had passed away. Then followed the frequent recurrence of scarlet fever cases in Grimstone throughout 1876, and the extensive diffusion of the disease as an epidemic in that village, in Great Massingham, and in other parts of the district during the past winter. No action whatever was, however, taken by the authority to stay the spread of the disease in any portion of the district during the whole of that period, notwithstanding the fact that its prevalence was frequently brought under their notice in numerous ways, as by occasional references to it in the report book of the inspector of nuisances, entries and special notes on the returns of pauper sickness, and in one instance by means of a special communication from a practitioner in King's Lynn as to the outbreak at South Wootton. Beyond the fact that this latter communication was immediately forwarded by the clerk to the chairman of the sanitary authority, and laid before the authority more than three weeks after, at the same time as an erroneous statement of the inspector of nuisances to the effect that the outbreak had subsided, nothing whatever appears to have been done with regard to any portion of this widely-spread epidemic until May, 1877. On the 5th of that month the rector of Great Massingham, acting on behalf of himself and other residents of the parish, wrote to the sanitary authority and expressed the opinion that the village ought to be carefully inspected by the medical officer of health 'in order to ascertain, if possible, the cause of the recurrence and continuance of the epidemic.' On the following day a special meeting of the sanitary authority was held for purposes other than the consideration of the epidemic in the district, and, in view of the rector's communication, the 'medical officer of health' was requested to undertake 'the necessary inspection,' and to report on the matter at the next meeting, on May 18. The report was to the effect that upwards of 100 cases of scarlet fever had occurred in Great Massingham, that other villages were infected, and the district was stated to constitute 'a source of contagion to the whole of the western division of the county.' These three visits to Great Massingham constitute the work of the medical officer of health for the Freebridge Lynn sanitary district for nearly three years. With regard to the duties of the inspector of nuisances, it is quite obvious from the condition in which I found Great Massingham that the efficiency as to nuisance-removal, to which the authority bore testimony in May, 1874, had long since ceased. Not only was this officer quite ignorant as to many of the gross nuisances prevailing in the village, but several of the inhabitants, who made loud complaint as to the conditions of filth by which their houses were surrounded, had clearly no idea that there was any officer to whom they could appeal in the matter. From January, 1875, to May, 1877, there are fifty entries in the inspector's report book relating to Great Massingham; four of them, made at different intervals, are to the effect that there were 'no nuisances' in the place, or that the parish was in a satisfactory 'state,' and most of the remainder relate to privy nuisances, some of which, reported as far back as from six to eighteen months ago, were still in existence at the date of my inspection. The inspector of nuisances in question appears to be an intelligent officer, and with regard to the great neglect which characterises that portion of his district which I visited, it should be noted, first, that an important portion of his time is taken up with his work as relieving officer; secondly, that he has never received any instructions as to the duties he was expected to perform in his capacity as inspector of nuisances; and thirdly, that when serious nuisances were reported, and again reported, by him to the sanitary authority, no action whatever was at times taken concerning them.

'Since mention has been made in another part of this report of a prevalence of scarlet fever in King's Lynn, it may be well by way of contrast to refer to the sanitary administration of that borough with regard to infectious disease. From information supplied to me it appears that the urban sanitary authority have arranged to pay a fee to the poor law medical officers practising within their district each time that they report the existence of a case of infectious disease to their medical officer of health, and that information thus acquired is invariably supplemented, as indeed was the case formerly in the Freebridge Lynn District, by reports of a similar character, which are voluntarily forwarded to the same officer by private medical practitioners. By such means the officers of the authority were informed of all the cases of scarlet fever which appeared in King's Lynn during the period of the recent epidemics in the Freebridge Lynn Union. The houses affected were at once visited by the medical officer of health, and if necessary the inspector of nuisances also; printed instructions, which are always kept in readiness, were delivered to the householders, describing the measures which should be adopted to prevent the spread of the disease, and, in case of a death, the precautions which should be taken in connection with the burial of the dead. These instructions were always supplemented by verbal explanations on the part of the medical officer of health, who also exercised a personal supervision in regard to the measures adopted for the disinfection or destruction of infected articles, etc. The result of this, even in the absence of the provision by the urban sanitary authority of

means of isolation for infectious diseases, has up to the present date been highly satisfactory; no spread of the disease has in any instance occurred beyond the house first affected, and nearly every case has been a single one. It is, indeed, impossible not to connect the course taken with the notable restriction of the disease in King's Lynn, as compared with its wide-spread prevalence in the Freebridge Lynn rural sanitary district, where no similar course was taken.'

EXHIBITION OF SANITARY APPLIANCES.

(*Continued from page* 125.)

WE must this week close briefly our notice of the exhibition at Manchester. Of all the ventilators exhibited, and their name is legion, we saw none better as foul air extractors than Boyle's patent self-acting air-pump ventilators; the particular advantage that these possess over others that rely for their action on the pressure of wind, is that having no mechanical motion they do not get out of order. As inlets for fresh air, vertical tubes seem to be increasing in public favour, and where intelligently applied, we can testify to their merits; the Lancashire ventilating Company, Messrs. Anderson and Wright, and Messrs. Shilleto and Shorland display various patterns of vertical tubes. We think these tubes should always be furnished with valves to regulate the supply according to the pressure, difference of temperature, etc. Dr. Rogers's portable disinfecting closet is a most useful apparatus, and every local sanitary authority would do well to possess one. Large and permanent drying and disinfecting closets for clothes are exhibited by Messrs. Thomas and Taylor and Messrs. Bradford and Co. The first mentioned firm combine with the closet an ironing-stove. The patent 'Radial' drying closet and disinfecting stove of the latter firm struck us as being particularly worthy of mention. A 'midfeather' stove enables the temperature to be raised, with a small quantity of fuel, to 300°; the distribution of heat is by means of radiating plates, the clothes being placed in galvanised iron baskets, which are made to slide in; the radial revolving horse is a very convenient contrivance; Messrs. Bradford also exhibits a portfolio of plans of laundries they have fitted up in various parts of the world.

Section IV. Smoke-consuming apparatus and methods for the purification of polluted rivers. We should have liked to have seen a better show in this section. There are more contrivances for the cure of smoky chimneys than for consuming smoke. We hope that those manufacturers who pour forth from their chimneys volumes of poisonous smoke into our towns may never find the cure for smoky chimneys at home.

The methods for the purification of polluted rivers are conspicuous by their absence.

Section V. Food, clothing, and personal conveniences.

Messrs. Hancock's ingenious machine for washing and cooling butter, and for turning salt butter into fresh, deservedly attracted much attention. Messrs. Chorlton and Dugdale's Excelsior spring mattress is well worthy the attention of hospital authorities; it has the threefold merit of being strong, comfortable, and cheap. Messrs. Goundry's compressed tea was recommended by the judges for its portability; our experience allows us also to recommend it for its flavour.

Law Reports.

SELLING A DISEASED PIG.

A CHESHIRE farmer, named J. Roberts, of Stanney Mill, in that county, was summoned at the Birkenhead Police Court, for sending the diseased carcase of a pig to the market at Birkenhead. The pig had died from scarlatina. The magistrate censured the defendant severely, and fined him 10*l.* and costs.

A 'CORNISH CUSTOM.'

AT the St. Austell Petty Sessions, P. Biddick, dairyman, was summoned for selling a pint of adulterated milk, which he stated was pure from the cow. The milk was analysed by the county analyst, who certified that it had been adulterated with water to the extent of from 7 to 15 per cent. Defendant admitted that he had watered it, but only 'according to the Cornish custom'—one pint to three gallons of milk. The chairman said that the public must be protected, for when they bought they were under the impression they had a pure article. This being the first case in the locality, the defendant was fined only 2*l.* and costs; but the bench intimated that if any more cases came before them, the penalty would be more.

THE FRAUDS ON THE ARTISANS' DWELLINGS COMPANY.

E. SAFFERY, estate agent, Dr. Baxter Langley, and W. Swindlehurst, respectively the chairman and secretary of the Artisans', Labourers', and General Dwellings Company, again surrendered to their bail at the Bow Street police-court, to answer charges of defrauding the company of 30,000*l.* On the conclusion of the case for the prosecution of the defendants, Mr. Lewis asked that they might be committed for trial on the various charges adduced against them of fraud and conspiracy. Mr. Vaughan then committed the defendants. The bail of Swindlehurst would remain as it was before, but that of the defendants Langley and Saffery would be increased. The defendants were liberated on bail.

CHARGE AGAINST A MILK DEALER.

J. TOPPING, milk seller, Farnworth, was charged with having sold skimmed milk, adulterated with water. Superintendent Holland stated that he visited defendant's shop, and asked Mrs. Topping if they sold milk. She replied affirmatively, and on being asked what sort of milk they sold, replied threepenny and fourpenny. Being asked what she called the milk, she said that they called both prices of milk 'new milk.' He was supplied with a pint of milk at 3*d.* He met the defendant afterwards, and on telling him that he had been to his shop and got a pint of threepenny milk, he said, 'The milk you have got from my wife is skimmed milk.' The milk was sent as skimmed milk to the analyst for the county, and he had certified that it was adulterated. Defendant said he sold two prices of milk. He never put any water into the milk, nor authorised any other person to do so. The magistrates declined to convict. [On what ground?]

BADLY BUILT HOUSES.

AT the Liverpool assizes, before Mr. Justice Hawkins, the case of *Yearsley* v. *Henderson* was tried. The case was one of some interest and importance to builders at watering-places. The plaintiff's house, one of a very 'jerry' description, was built on the sand at New Brighton, the rear portion being built with very slight foundations. The defendant was the builder employed by the neighbouring landowner, and found it necessary whilst building a house on the adjoining land to underpin the plaintiff's house. Considerable damage in the shape of cracks and subsidence occurred about that time, and the plaintiff alleged that this was caused by the negligent underpinning of the defendant's workmen. Other questions as to support were raised, but the crucial point was whether or not the defendant had taken due and proper precautions, considering the character of the soil. The defendant conclusively proved that he had underpinned in lengths of not more than 2 ft. at a time, and that he inserted boards to keep the sand from running out in any quantity. The jury returned a verdict for the defendant, which shows that if a builder takes proper precautions he is not responsible for damage to a worthless house which may arise from his operations, in the eyes of a common-sense jury.

AN OBJECTIONABLE CHANGE IN BUILDING BY-LAWS.

AT a meeting of the Slough Local Board Mr. Barrett asked the board to agree to an alteration of one of the by-laws. He referred to that which required builders to carry up the party-wall above the roof of the houses to a distance of 12 in. measured at right angles from the slope, the object being to prevent the spread of fire from house to house. He said it was almost impossible to keep the wet from coming down between the wall and the slates, and there was hardly any material but lead which was effectual, but its price was prohibitive in the smaller class of houses. He thought it would benefit the neighbourhood if they would so far alter the by-law. There was now a movement in the building trade, which had been at a stand for some time, and it was desirable to give an impetus to it if possible. The alteration was approved.

PROCEEDINGS BY MILK DEALERS.

AT Hammersmith, Mrs. Reeves, a cowkeeper, was summoned for selling milk adulterated with water, to the prejudice of W. Glover, a dairyman. Mr. Ricketts appeared to support the summons, and said that the defendant supplied the complainant with milk at 2*s.* per gallon. In consequence of complaints from his customers he had a sample of the milk analysed, and received a certificate stating that it was adulterated with 25 per cent. of water. The defendant said the only way she could account for it was that her man left water in the churn to cool it, and forgot to empty it. She never had a complaint before. Mr. Ricketts said water must have been accidentally left in the churn four days running, as the milk supplied was tested on each day. Mr. Paget pointed out to the defendant that she was liable to a penalty of 20*l.* He fined her 3*l.* and 1*l.* 13*s.* 6*d.* costs.

WHAT IS A FACTORY?

AT the Guildhall, Mr. Charles Starbuck, of 4, Distaff Lane, packer and finisher, was summoned by Mr. Oram, factory inspector, for employing children under the age of thirteen years without registering them, or obtaining a medical certificate. Mr. Oram stated that the meaning of a factory was 'any premises whether in the open air or not, in which the process of bleaching, beetling, dyeing, calendering, finishing, hooking, lapping, and making up and packing any yarn or cloth, of any material, or the dressing or finishing of any one or more of such processes, or any process incidental thereto, are or is carried on.' He contended that the defendant's premises came within the Act as a factory. Mr. Kent contended that the premises were not within the Act, as they were not used for either dyeing, bleaching, calendering, or finishing. It was true that the defendant had employed three boys since the early part of the year, but in consequence of these summonses he had decided on not employing boys any longer. The boy Want had already been under notice to leave before the summonses were taken out, in consequence of the interference of the School Board. Evidence was then given to show the nature of the business carried on, which was that of packing and finishing certain goods. A long technical argument ensued as to the meaning of the terms in the Act, and as to whether the defendant's premises came within the Act. Alderman Finnis adjourned the case, so that the premises might be visited.

BATHING IN THE SERPENTINE.

AT Marlborough Street, G. Gray was charged with using soap while bathing in the Serpentine. Constable Kempson saw the defendant about half-past seven o'clock that morning washing himself with soap. He was also washing some rags. He told him he was infringing the Park regulations, and his reply was that he had always done the same thing. Mr. Andrews said he was in the habit of bathing in the Serpentine, and would be glad to know if a man with running wounds was to be permitted to bathe in the limited space, 600 yards, assigned to bathers by the Park authorities. He thought it not impossible that persons bathing near might catch some disease, and on that account the practice ought to be stopped. Mr. Newton said the regulations stated nothing about a man bathing his wounds, only as to the use of soap, which was not to be used. It appeared to him that a common sense of decency ought to prevent an afflicted person from exposing his wounds publicly. The defendant had rendered himself liable to a fine of 5*l.* The defendant said he had been ordered by the doctor to use plenty of water. Mr. Andrews asked if a person with sores ought not to be prevented from washing the rags taken off them in water where the general public bathed. Mr. Newton said he could not prevent persons bathing, he could only prevent them from using soap. The defendant said he was only washing his hands and arms, and would not do so again. Mr. Newton told the defendant that what he wanted to point out to him was the impropriety of his bathing at all with wounds. The defendant, who promised to discontinue bathing in the Serpentine, was then fined 20*s.*, or fourteen days.

WATER-SUPPLY.

THE new Act, 40 & 41 Vict. cap. 31, contains some important provisions as to the supply of water. It is to give further facilities to land owners of limited interest in England and Wales and Ireland to charge their estates with the expenses of constructing reservoirs for the storage of water, and other similar purposes. After referring to the charge on estates for the supply of water for agricultural purposes, the Act recites that in many places it would greatly conduce to the affording of a plentiful supply of pure water to the inhabitants of villages and towns, and to the industrial requirements of the locality, if facilities were given to landowners of limited interests to charge their estates, subject to the approval of the Inclosure Commissioners, with sums expended by them in constructing reservoirs and other works for the supply of water of a character permanently to increase the value of such estates for other than agricultural purposes, or to be otherwise permanently productive of profit to the owners of the estates, and if such landowners were also enabled to charge their estates with sums subscribed by them for the construction of waterworks on the same terms and conditions as those on which they are now enabled to charge their estates with subscriptions for the construction of railways and canals. The mode of carrying out the statute with the Inclosure Commissioners is set forth, and if adopted would be of great public benefit, as stated, in securing a 'plentiful supply of pure water to the inhabitants of villages and towns.'

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

REDDITCH DRAINAGE.

(*To the Editor of the* SANITARY RECORD.)

SIR,—In your number for last week (date, August 17), you have given us the authority of your important organ for a view of our drainage question so one-sided and so untrue, that we, the inhabitants of Redditch, have a claim to be heard in reply. This claim we should not have made on our own account—our position and our case is rightly stated in the proper quarter; but it is different with Mr. Roberts, C. E., Preston, whose plans and estimates are so monstrously misrepresented, and his professional reputation so grossly wronged.

You quote the chairman of our local board, but you do him the injustice to misquote him. You make him say

of Mr. Roberts' estimate, 'The first estimate of 4,300*l.* has swelled by extensions not provided for into some 8,560*l.*' That slight tumefaction of some 4,000*l.* is merely the chairman's own 'handywork on the head' of an opponent. Mr. Roberts did make an addition to his figures, it is true, for some matters he was told would be necessary *as additions*; but the amount was 3,000*l.*, not 4,000*l.*! The plan, with its additions, is laid before the Local Government Board with an estimate of 4,600*l.* (the board's plan is, as you say, 8,206*l.*). Mr. Roberts gives an undertaking to find a responsible contractor to execute the work for the sum, and they must stand, the plan and estimate, by the fiat of the Local Government Board, and not by any *ex parte* or biassed statement. WILLIAM GUISE.

Hon. Sec. Ratepayers' Protection Assoc.

Redditch, August 20, 1877.

Sanitary Inventions.

FOLLOWS AND BATE'S PATENT ARCHIMEDEAN SCREW VENTILATORS AND SMOKE CONDUCTORS.

THESE ventilators, unlike those with no moving parts, possess the advantage of exerting a powerful extracting influence upon vitiated air, regulated by the speed at which they are driven by steam or other power when a strong upward exhaust current is required. In the case of factories, theatres, music halls, printing establishments, and other buildings of large area, a propelling power of some kind is advantageous, but for smaller places the apparatus will work for an indefinite time without attention. The revolving cowl terminates below by an archimedean screw entirely filling the tube in which it works. Having but one point of support, and that upon an agate centre, the slightest movement of the air suffices to render the apparatus effective. The careful finish of the mechanical portion of the contrivance minimises friction to the greatest possible extent. This single point of support is the peculiarity and special advantage, giving these ventilators a freedom of movement and durability not approached by those of more complicated mechanism. Noiseless in action, reasonable in price, and thoroughly effective, they have been very largely adopted for every class of building in which ventilators are used. Some have been in use for many years without repair or attention of any kind. They are made in every size, from 6 to 48 inches in diameter, by Messrs. Follows and Bate, Patentees and Sole Manufacturers, Dutton Street Works, Manchester.

BRADFORD AND CO.'S LAUNDRY AND DISINFECTING APPARATUS.

A COMPLETE set of laundry apparatus exhibited by this well known house obtained five certificates of merit at the Manchester and Salford Exhibition of Sanitary Appliances. They were awarded for—(1) Bradford's Patent 'Radial' Drying Closet and Disinfecting Stove; (2) Improved 'Draw-out' Drying Closet; (3) 'Vowel' A 10 Steam Power Washing Machine, for the general washing of hospitals, asylums, etc.; (4) 'Vowel' A 7 Steam Power Washing Machine, for the special washing of hospitals, asylums, etc.; (5) 'Vowel' A 2 and A 4 Hand Power Washing Machines, for small hospitals, workhouses, etc. In addition to these a patent 'Premier' box mangle, new patent 'Shuttle' washing machine, and a calendering machine heated by steam were exhibited.

The drying closet, disinfecting stove, and 'draw out' clothes drying closet are under ordinary circumstances heated by one fire; but in the Exhibition, for want of room, the 'draw-out' closet was detached. By a patented but really simple arrangement, the heat can be directed to any part of the apparatus at which it may be required. To proceed from left to right in arrangement of the various compartments, we first have the 'draw-out' clothes drying closet, next a compartment for the disinfection of mattresses and bedding, then the drying closet for the destruction of vermin in articles of apparel and bedding, and finally the largest chamber, some six feet high, provided with a central perpendicular rod, having projecting horizontal radial arms, the whole capable of rotation, for ease in filling the compartment.

By this arrangement of radial arms every inch of space is utilised and each article thoroughly subjected to the influence of the high temperature existing in the apparatus. Patent hooks sliding upon the radial arms obviate the necessity of touching articles about to be disinfected. A simple arrangement of air chambers over the fire prevents the possibility of scorching even the most delicate articles. We witnessed in fact a demonstration that a temperature of 300° was borne without the slightest injury to a delicate fabric. A great and important advantage possessed by the whole apparatus is that any desired temperature may be maintained for a considerable time without attention, and that it may be regulated to a nicety. A sensitive pyrometer is affixed to the exterior of the apparatus. To obviate inconvenience when removing articles a means of rapidly cooling the chambers is provided in the shape of a ventilator at the top of the apparatus, and valves for the admission of cold air below. Every care seems in fact to have been taken to render the apparatus efficient, with a perfectly satisfactory result.

Its economy in use is remarkable, as the whole of the processes are carried on at a cost of about eightpence per day for fuel, comparing favourably with gas in point of economy, while in first cost the apparatus is considerably below others less effective in use.

In close proximity were the patent rotary washing machine, with wringing apparatus attached, patent calendering apparatus, and 'Premier' box mangle, exhibited by the same house, and all driven by the same steam engine.

In construction the washing machine consists of an octagonal box or barrel supported by and revolving on hollow pivots at each end. These serve respectively for the entrance of water and the escape of steam. The mechanical contrivance of the interior of the machine is simply a board six inches wide, and having its edge directed towards the axis of revolution. When in use the receptacle is about half-filled with clothes and suds, the cover screwed down, and the barrel put in motion. Passing round and collecting the articles on its upper surface, the projecting board at last lifts them nearly to the top point of its revolution, and here being without support they fall violently to the bottom, to be subjected to the friction of the interior angles of the barrel, and again agitated by the action already described. This is sufficient to perfectly cleanse dirty clothes in a few minutes, and is less destructive to their texture than hand washing. Put in motion by a movement of a lever is a wringing apparatus with patent rollers, and guard bar to secure the safety of the attendant. India-rubber rollers of ordinary construction are exceedingly dangerous, and have frequently been the cause of lamentable accidents, a result impossible in the apparatus under notice.

For very foul linen used for ulcers, burns, amputations, and other cases, and the articles worn by imbecile inmates, the 'Shuttle' hand machine exhibited is well adapted. It consists of a capacious box having two parallel rods by which a weighted wooden block is guided. A rocking motion obtained by means of a lever of convenient height, and not beyond the power of a mere child, effectually beats out every kind of dirt by the rapidly oscillating motion of the block. Without opening the box a current of clean water can, if required, be passed through it without disturbing the contents or admitting the escape of injurious vapour. This machine is, in fact, intended in large institutions to save polluting the contents of the larger machine by articles of exceptional dirtiness. It is, however, a remarkably useful and convenient apparatus in itself, and

a thorough washing machine for any class of work. The 'Premier' box mangle, a massive and splendid machine—in fact, by far the finest mangle we have ever seen—does the mangling perfectly, with little attention and trouble. The calender heated by steam, with the recent improvements the manufacturers have lately introduced, is now suitable for every class of hospital and asylum mangling, and imparts such a beautiful gloss and finish to table and bed linen that one might well mistake it for new. A similar calender, heated by gas, was not exhibited for want of space.

We have described this useful set of apparatus at length, as the exhibitors took some pains to explain the action and construction of their inventions. Having seen the machines perform the various operations of cleaning soiled garments, washing the ordinary linen of a household, wringing, drying, and calendering it, we can safely add our testimony to the merits of the inventions by which the results are achieved. In large establishments, where a considerable amount of laundry work has to be performed, the saving in labour and time is immense when mechanical contrivances such as these are used. Simple in construction, and almost perfect in detail, reasonable in first cost, and effective in action, they recommend themselves. Messrs. T. Bradford and Co., 140 to 143 High Holborn, London, Cathedral Steps, Manchester, and Crescent Iron Works, Salford, are the manufacturers.

THE ALBION MILK AND SULPHUR SOAP.

A SOAP possessing the qualities of perfect purity, delightful fragrance, with absence of unnecessary and fraudulent addition of perfume and colouring matter is an almost incalculable boon, whether for ordinary use or as a remedy in cases of skin disease or sensitive cuticle. The soap under notice possesses valuable detergent and disinfecting properties, and is entirely free from the irritating effects often produced by carbolic acid and coal tar soaps.

Sulphur is so well known and its use sometimes is of so much value in nearly every kind of skin disease, that a soap containing it in really effective yet mild proportion has often been sought for in vain. Its combination with milk is an entire novelty, and a problem which had always seemed almost impossible of solution. At last, however, the apparently impracticable combination has been effected by the ingenious device of using cream, which has the greatest affinity for soapy matter, and gives a remarkable smoothness of texture. As a perfect and elegant toilet soap, yet acting sufficiently on the skin, we would recommend, after many trials, the use of the Albion Milk and Sulphur Soap in eczema, tinea, and pruritus. Analyses of this soap indicate a perfect combination of purity and elegance, one well fitted for nursery and general use.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

BAKER, Mr. Henry, has been elected a Member of the East Dereham Local Board, vice Hatfield, resigned.

BROWN, George Arthur, M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the Tredegar Urban Sanitary District, at 50*l.* per ann. for five years.

BROWN, Mr. Joseph, has been appointed Inspector of Nuisances for the Tunbridge Rural Sanitary District, vice Robinson, deceased, at 120*l.* per annum for three years.

DAVIES, Benjamin, M.D. Univ. Edin., F.R.C.S. Eng., has been reappointed Medical Officer of Health for the Newport, Mon., Urban Sanitary District for the ensuing year.

DEAN, Mr. James, has been appointed Inspector of Nuisances and Clerk and Attendance Officer to the School Attendance Committee of the Hindley Local Board and Urban Sanitary Authority, Lancashire.

DERRY, Mr. George, has been appointed Collector and Sub-Sanitary Inspector to the Fenton Local Board and Urban Sanitary Authority, Staffordshire, vice Burton, resigned.

DOSWELL, Mr. Charles, jun., has been appointed Surveyor and Inspector of Nuisances to the Ashford Local Board and Urban Sanitary Authority, vice Lorden, resigned

FAUSSET, Herbert John, M.B.C.M. Univ. Dub., has been appointed Medical Officer of Health for the Tamworth Rural Sanitary District, vice Brunton, resigned.

LEE, Mr. John, has been appointed Clerk to the Weardale Guardians and Rural Sanitary Authority, Co. Durham, vice Bates, resigned.

MEASURES, John William, M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the Wisbech Port Sanitary District, vice Ewen, resigned.

OLDMAN, John, M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the Huntingdon Urban Sanitary District, vice Holderness, resigned.

RIDGE, Mr. James, has been appointed Inspector of Nuisances and Hackney Carriages for the Wigan Urban Sanitary Authority, vice Heath, resigned; 100*l.* per annum, and an allowance for clothing.

SMYTH, William John, M.D. Qu. Univ., Irel., L.R.C.P. Edin., L.R.C.S. Edin., has been appointed Medical Officer of Health for the Shipley Urban Sanitary District, Yorkshire, vice Ellis, whose appointment has expired, at 60*l.* per annum for three years.

STEPHEN, I. T., Esq., Manager of the Crickhowell Branch of the National Provincial Bank of England, has been appointed Treasurer to the Crickhowell Guardians and Rural Sanitary Authority, vice Frater.

TERRY, Mr. Richard, has been elected a Member of the Ossett-cum-Gawthorpe Local Board and Urban Sanitary Authority, vice Ellis, deceased.

WILLIAMS, Mr. H., has been reappointed Inspector of Nuisances for the Newport, Mon., Urban Sanitary District, for the ensuing year.

WORTH, Mr. James, has been appointed Assistant Surveyor and Inspector of Nuisances to the Corporation and Urban Sanitary Authority of Gravesend, vice Andrews, resigned: 150*l.* per ann.

VACANCIES.

BOURNEMOUTH IMPROVEMENT COMMISSIONERS AND URBAN SANITARY AUTHORITY. Clerk.

BROMYARD, HEREFORD, LEDBURY, LEOMINSTER, AND WORSLEY RURAL SANITARY DISTRICT. Medical Officer of Health. 50*l.* per ann. for three years. Application, Sept. 5, to T. Llanwarne, Clerk to the Committee, Hereford.

EAST DEREHAM URBAN SANITARY DISTRICT. Medical Officer of Health.

NARBERTH RURAL SANITARY DISTRICT, Pembrokeshire. Inspector of Nuisances and School Attendance Officer.

PENRITH URBAN SANITARY DISTRICT, Cumberland. Medical Officer of Health. Inspector of Nuisances.

STOCKTON-ON-TEES, CORPORATION AND URBAN SANITARY AUTHORITY OF. Surveyor: 300*l.* per ann. Application, Sept. 21, to H. G. Faber, Town Clerk.

THETFORD URBAN SANITARY AUTHORITY, Norfolk and Suffolk. Collector.

TONG STREET LOCAL BOARD AND URBAN SANITARY AUTHORITY, Yorkshire. Collector: application, 11th September, to C. M. Wilson, Clerk, Bradford, Yorkshire, addressed to 'The Chairman of the Local Board.'

WAYLAND GUARDIANS AND RURAL SANITARY AUTHORITY, Norfolk. Clerk, etc. 65*l.* per ann., as Clerk to the Guardians, 20*l.* per ann. as Clerk to the Sanitary and School Attendance Committees, 20*l.* per ann. as Clerk to the Assessment Committee, and fees as Superintendent Registrar of Births, etc. Application, September 1, to E. Cubitt, Clerk, Bintry, near East Dereham.

WEST HARTLEPOOL URBAN SANITARY DISTRICT. Medical Officer of Health: 20*l.* per ann.

WIDNES URBAN SANITARY DISTRICT, Lancashire. Inspector of Nuisances. 100*l.* per ann. Application, Sept. 3, to Thomas Beasley, Law Clerk.

SANITARY PATENTS.

2661. The manufacture of new substances or compounds resembling bone or ivory black or animal charcoal, and designed for use as a substitute therefor. William Robert Lake, Southampton Buildings, London. A communication from the Tit Filter Company, Paris.

2697. Improvements in apparatus for purifying ozone. William Robert Lake, Southampton Buildings, London. A communication from Frederick William Bartlett, Buffalo, New York, U.S.

2725. Improvements in treating sewage and other foul water by the use of liquids only; also an improved method of treating sewage and foul water by the use of solid ingredients combined with liquids: and improvements in softening clarified and hard water. John Hanson, Savile Town, Dewsbury, Yorkshire.

NOTICE.

THE SANITARY RECORD *is published every Friday morning, and may be ordered direct from the Publishers. Annual Subscription, 17s. 4d.; free by post, 19s. 6d.*

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Original Papers.

ON THE WATER-SUPPLY OF SEASIDE WATERING-PLACES.

BY G. W. WIGNER, F.C.S.

(*Continued from p.* 135.)

BRIGHTLINGSEA is a small place supplied by a well situate about 1½ mile from the sea. The well is said to be only 18 ft. deep, and there appears to be no provision for either storage or fire, although there is a constant supply. Some time since the water was analysed for the Great Eastern Railway Company, and it is stated that the report to them was that it was the best water supplied to any of their stations. The results I obtained by an analysis of a sample drawn from the mains are as follows:

	Grains per gallon.
Total solid matter	33·60
Loss on ignition after deducting combined carbonic acid	15·79
Lead and copper—none.	
Iron—heavy.	
Chlorine calculated as chloride of sodium	7·49
Hardness before boiling, 8·5° (Clark's scale)	
,, after boiling, 7·8° ,, ,,	
Nitrogen as ammonia	0·0012
,, albuminoid ammonia	0·0035
,, nitrates	1·7930
,, nitrites	0·0100
Total nitrogen in these four forms	1·8077
Oxygen absorbed by organic matter	0·0144

The water was of a good pale blue colour, and had a fair taste, but it had a slight smell when heated. The microscopical examination was, however, satisfactory; no living organisms could be detected, and except the traces of vegetable matter, which seem to be almost inseparable from shallow well-waters, there was nothing to complain of. The most objectionable feature of this water is unquestionably the nitrates. The amount present is dangerous for a shallow well-water such as this. It is impossible without an inspection of the place itself to say from what source this excess of nitrates is derived, but as the well is reported to be at such a distance from the town, it seems most likely that manured fields furnish the supply, and although in the case of this present sample, the nitrogenous matters present have been mostly oxidised, it is impossible to depend upon such an action going on continually. The source of this contamination certainly needs looking to.

SOUTHEND.—The supply is derived from an artesian well in the hamlet of the same name at the back of the town; the well is said to be 900 ft. deep, and there is a constant supply to the town. My sample was drawn from the main, and the results are as follows:

	Grains per gallon.
Total solid matter	68·20
Loss on ignition after deducting combined carbonic acid	4·59
Lead and copper—none.	
Iron—slight traces.	
Chlorine calculated as chloride of sodium	38·14
Hardness before boiling, 1·6° (Clark's scale)	
,, after boiling, 0·2° ,, ,,	
Nitrogen as ammonia	0·0116
,, albuminoid ammonia	0·0027
,, nitrates	0·5600
,, nitrites	0·0200
Total nitrogen in these four forms	0·5943
Oxygen absorbed by organic matter	0·0400

The smell and colour of the water were both satisfactory, but the taste was saline. The water contains an excessive amount of chlorine, which in this case is most probably derived from the water-bearing strata. The microscopical appearance of the sample was quite satisfactory, and the water certainly has one great recommendation for domestic use, viz., it is a soft one. The undue amount of salt certainly needs looking to, but except on this point the water-supply may be considered satisfactory.

SHEERNESS is the next place we come to. The well which supplies the town is reported to be 380 feet deep; the site for it, near to the sea, has been badly chosen, and it is much troubled with blowers of sand. The local authorities are sinking a new well into the chalk, and it is now nearly completed. At present there is a supply for about eight hours only per day, but it is stated that as soon as the new well is completed, the authorities intend to give a constant supply. The water is not filtered—the supply is always available in case of fire.

The results of the analysis of a sample drawn from the main were as follows:

	Grains per gallon.
Total solid matter	44·60
Loss on ignition after deducting combined carbonic acid	4·80
Lead—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	7·13
Hardness before boiling, 10·6° (Clark's scale)	
,, after boiling, 0·2° ,, ,,	
Nitrogen as ammonia	0·0020
,, albuminoid ammonia	0·0009
,, nitrates	0·8320
,, nitrites	0·0170
Total nitrogen in these four forms	0·8519
Oxygen absorbed by organic matter	0·0304

The water was slightly turbid but quite free from objectionable taste or smell, and the results of the microscopical examination were quite satisfactory. It will be noticed that the permanent hardness is extremely low and that the proportion of albuminoid ammonia is lower than in any sample I have previously referred to; the only bad feature in the analysis is the amount of nitrogen in the form of nitrates, which is higher than could be wished. I hope that the water from the new well when it is finished will be as good, but in order that this may be the case it will be necessary for them to employ a softening process to eliminate the chalk from the water.

I received another sample from the surveyor of the town, and this, although drawn more than a fortnight after the previous one gave results almost identical, the difference in solids, etc., amounting to only one- or two-tenths of a grain per gallon, and the other figures of the analysis corresponding closely. The water is, therefore, uniform in quality, and this is another great point in its favour.

HERNE BAY on the Kentish coast is our next place. I reported last year on the water-supply of this town* I then gave the analysis of the public supply, and also of a sample obtained from the well of a house where a gentleman had recently died, and whose death was attributed to the bad quality of the water. The results then obtained were as follows: . . . .

* See SANITARY RECORD, Oct. 14, 1876, p. 245.

	Town Supply. Grains per gallon.	Well. Grains per gallon.
Total solid matter	36·80	107·70
Loss on ignition after deducting combined carbonic acid	2·00	34·06
Lead and copper—none.		
Iron—traces.		
Chlorine calculated as chloride of sodium	7·60	39·91
Hardness before boiling, Town Supply, 28·°; Well, 50° (Clark's scale)		
Hardness after boiling, Town Supply, 9·°; Well, 44° (Clark's scale)		
Nitrogen as ammonia	·0030	·0450
,, albuminoid ammonia	·0060	·0050

The public supply was then free from suspended matter, and had a satisfactory taste and smell; but the microscopical examination showed imperfect filtration. The well water contained traces of suspended matter, and had an offensive smell, bad colour, and objectionable taste.

This year I have obtained another sample from a main of the town supply, which gave the following results:

	Grains per gallon.
Total solid matter	35·70
Loss on ignition after deducting combined carbonic acid	4·40
Lead and copper—none.	
Iron—slight trace.	
Chlorine calculated as chloride of sodium	7·84
Hardness before boiling, 16·5° (Clark's scale)	
,, after boiling, 6·0° ,, ,,	
Nitrogen as ammonia	0·0007
,, albuminoid ammonia	0·0012
,, nitrates	traces
,, nitrites	0·0200
Total nitrogen in these four forms	0·0219
Oxygen absorbed by organic matter	0·0256

These results are therefore fairly concordant with those of last year, as regards solid matter; but on the whole, and especially in reference to albuminoid ammonia, more satisfactory. The albuminoid ammonia in this sample is very low, the colour fair, and the water was free from objectionable taste and smell. There were very slight traces of suspended matter, but the microscopical appearance was perfectly satisfactory. The absence of nitrates is marked, and combined with the other features of the sample points it out as an excellent water in nearly every respect except the hardness.

There is a public pump on the parade, within a very short distance, probably not more than 10 or 20 yards, of the sea; it is said the water from this is not used for drinking purposes, but at the time of my visit a number of children were drinking from a ladle attached to the spout of the pump. The results of my analysis of a sample of this water were as follows:

	Grains per gallon.
Total solid matter	57·90
Loss on ignition after deducting combined carbonic acid	5·70
Lead and copper—traces.	
Iron—traces.	
Chlorine calculated as chloride of sodium	17·80
Hardness before boiling, 14·0° (Clark's scale)	
,, after boiling, 13·0° ,, ,,	
Nitrogen as ammonia	0·0300
,, albuminoid ammonia	0·0057
,, nitrates	trace.
,, nitrites	0·0200
Total nitrogen in these four forms	0·0557
Oxygen absorbed by organic matter	·0416

The sample was milky in appearance, from the presence of considerable quantities of suspended matter, which, when it settled down to the bottom of the bottle, was of a dirty brown colour, and appeared to consist mainly of clay. The general microscopical appearance was satisfactory, and its worst fault clearly is its saline character, which is probably due to infiltration from the sea.

WESTGATE is about ten miles further on. The supply is derived from a well in the chalk which is sunk on the top of a slight hill at the back of the place; the water is supplied under constant pressure, and the supply is said to be more than sufficient for the utmost requirements of the place during the visiting season.

Last year I found the quality of the water here very good.* The following are the results obtained from a sample drawn from a main on July 17 this year:

	Grains per gallon.
Total solid matter	33·50
Loss on ignition after deducting combined carbonic acid	3·50
Lead—very minute traces.	
Iron—slight traces.	
Chlorine calculated as chloride of sodium	6·78
Hardness before boiling, 20·0° (Clark's scale)	
,, after boiling, 4·8° ,, ,,	
Nitrogen as ammonia	0·0005
,, albuminoid ammonia	0·0012
,, nitrates	0·7900
,, nitrites	0·0200
Total nitrogen in these four forms	0·8117
Oxygen absorbed by organic matter	0·0288

The principal variations from the results obtained last year are that the total solids have increased by 4 grs., while the ammonia and albuminoid ammonia have both decreased. The water had a very pale blue colour, and was perfectly free from suspended matter, and the microscopical examination did not show any organic matter. It is a very pure water, harder than the Sheerness supply, and containing a trace less nitrates. It has no objectionable characteristics except the hardness common to chalk waters.

MARGATE has a nominal population of 15,000, but during the season this is probably increased to 40,000 or 50,000. The supply is derived from two wells in the chalk. The old one is in a bad position, comparatively near the town, and only about 50 ft. deep, and the greater part of the supply is derived from this. The new one (which has only just been sunk) is in a much better position, about 1½ miles from the town, and about 90 feet deep, but unfortunately it is either too small or not deep enough to furnish anything like the quantity of water required. There is a constant supply, but the quantity appears to be insufficient. I have analysed two samples, one drawn by myself from a public drinking-fountain, on July 14, the other forwarded by the secretary of the water company, on July 30. The latter sample is reported to be drawn entirely from the old well. I place the results side by side:

	Drinking Fountain, July 14. Grains per gallon.	Water Company, Old Well, July 30. Grains per gallon.
Total solid matter	64·20	68·60
Loss on ignition after deducting combined carbonic acid	9·30	12·39

* See SANITARY RECORD, September 16, 1876, p. 181.

	Drinking Fountain, July 14. Grains per gallon.	Water Company, Old Well, July 30. Grains per gallon.
Lead and copper—none.		
Iron—traces.		
Chlorine calculated as chloride of sodium	32·76	33·70
Hardness before boiling, Drinking Fountain, July 14, 24·0°; Water Company, Old Well, July 30, 19° (Clark's scale)		
Hardness after boiling, Drinking Fountain, July 14, 10·4°; Water Company, Old Well, July 30, 7° (Clark's scale)		
Nitrogen as ammonia	0·0025	0·0072
,, albuminoid ammonia	0·0060	0·0045
,, nitrates	0·8480	0·4220
,, nitrites	0·0140	0·0080
Total nitrogen in these four forms	0·8705	0·4417
Oxygen absorbed by organic matter	0·0272	0·2500

Both samples were of a dirty blue colour, with heavy traces of suspended matter, showing that there evidently had been no attempt at filtration. The samples also agreed in having a slightly offensive smell when warmed, and, as may be expected from the large quantity of salt present, they had a bad saline taste. The microscopical examination showed the presence of a great deal of vegetable matter, but I could not detect any living organisms or animal remains.

Last year this supply was most variable, and I condemned it strongly, and it was reported that in consequence the town authorities had an independent analysis made, but they declined, and still decline, to publish this analysis. The medical officer of health, however, stated in his report that the general result of the analysis was that the water was free from organic contamination, but was somewhat hard and brackish. A comparison of my present analysis with that of last year shows a decrease of the total solids, chlorine and volatile matters, and, as compared with three out of the four analyses made last year, a large decrease in the albuminoid ammonia.

Apparently, therefore, the company have done something towards stopping the infiltration from the sea which evidently takes place, and it would appear possible that they have also cleaned out the old well. There is, however, much to do yet before the water can be pronounced a proper supply for such a town, and the authorities of the town should take the matter in hand at once, and act energetically themselves, if the water company cannot or will not act. It would be much better to discontinue the use of the old well entirely, and deepen the new one until it gives a sufficient supply.

BROADSTAIRS has a resident population of 2,000, increasing during the season to 5,000 or 6,000. The water is derived from two wells in the chalk, the older one of which is near the town, and the other near the village of St. Peters, and it is supplied to the town under constant pressure, the quantity being estimated at 20 gallons per head per day. Last year, after I condemned the water from the old well,* it was stated that its use had been given up, but on July 14 this year engines were certainly at work at both wells, so that I suppose water was still being pumped from both, and in that case the sample I obtained is a mixture of the water from the two wells. It was drawn from one of the hydrants used for supplying the watering-carts, and gave the following results:

	Grains per gallon.
Total solid matter	65·46
Loss on ignition after deducting combined carbonic acid	3·00
Lead and copper—none.	
Iron—very slight traces.	
Chlorine calculated as chloride of sodium	13·10
Hardness before boiling, 17·0° (Clark's scale)	
,, after boiling, 6·5° ,, ,,	
Nitrogen as ammonia	0·0012
,, albuminoid ammonia	0·0031
,, nitrates	1·2980
,, nitrites	0·0170
Total nitrogen in these four forms	1·3193
Oxygen absorbed by organic matter	0·0260

The water was of a good pale blue colour and had no objectionable smell. It had, however, a distinctly saline taste. The microscopical results were very unsatisfactory; there were a large number of living organisms present, mostly monads and a few small particles of animal *débris*. The amount of nitrates is twice as much as that found in unpolluted wells in this district. It is not possible to compare these results with those I published last year, as I cannot tell in what proportion the water from the two wells has been mixed in this sample, but supposing the wells to have been supplying about equal quantities, the total solids present have increased by nearly twenty grains per gallon, while the nitrogenous compounds have diminished. I think it more likely, however, that the bulk of the sample is derived from the old well, and if so the well certainly ought to be cleaned out and the water from it efficiently filtered before being distributed, or better still, it should be closed entirely.

Dr. Frankland is reported to have analysed the water from the new well last November, and a copy of his report which has been forwarded to me is as follows:

[COPY.]

SIR,—Herewith I send you results of the analysis of the sample of water which you left here for investigation, marked *New* Waterworks. It is of most excellent quality for all dietetic purposes but is too hard for washing; it has all the characteristics of unpolluted deep well water, being palatable and almost entirely free from organic matter. The turbidity is owing to the deposition of chalk on standing.

I am informed that Dr. Frankland's analysis was made very soon after the new well was sunk, but as I have not received a copy of the figures of the analysis I cannot say whether any change has taken place in the water since that time. I have received no analysis of the water from the old well. It is certainly folly, if not worse, to publish the analysis of the water from one well while the supply is derived from two differing essentially in their character.

RAMSGATE has a winter population of about 16,000, and during the season this is increased to 45 or 50,000. The water-supply is intermittent and is derived from a well in the chalk at a distance of some three quarters of a mile from the town. The supply at present is for some four hours per day only, but the local board have wisely purchased the water works, and as soon as possible intend to give a constant supply. The quantity at present supplied is estimated at only 10 gallons per head, per day, an

* See SANITARY RECORD, September 16, 1876, p. 181.

obviously inadequate quantity, but the supply is available in cases of fire.

I have analysed two samples, one drawn on July 14 last, from the drinking fountain at the pier gates, and the other received from the surveyor of the town on July 23 last. The results are as follows:

	Drinking Fountain, July 14. Grains per gallon.	Surveyor, July 23. Grains per gallon.
Total solid matter	28·50	33·60
Loss on ignition after deducting combined carbonic acid	4·20	4·43
Lead and copper—none.		
Iron—traces.		
Chlorine calculated as chloride of sodium	6·76	6·67
Hardness before boiling, Drinking Fountain, July 14, 19·0°; Surveyor, July 23, 18·6° (Clark's scale)		
Hardness after boiling, Drinking Fountain, July 14, 3·5°; Surveyor, July 23, 4·2° (Clark's scale)		
Nitrogen as ammonia	0·0011	0·0040
,, albuminoid ammonia	0·0035	0·0037
,, nitrates	0·4190	0·4880
,, nitrites	0·0130	0·0060
Total nitrogen in these four forms	0·4366	0·5017
Oxygen absorbed by organic matter	0·0210	0·0110

Both samples were of excellent colour and entirely free from objectionable taste or smell; in neither case could I detect by microscopical examination any animal remains. There were traces of fibre from leaves of plants, but these were only in moderate quantity. The results differ but little from those I obtained last year, the principal changes being a reduction in the amount of the nitrogenous compounds and an improvement in the microscopical results. There is no fault to find with this water except the old one of hardness; it may be said to be on a par with Westgate and Sheerness and far superior to either Broadstairs or Margate.

In my next paper I shall consider the supply at Sandwich, Deal, Dover, Folkestone, Sandgate, Hastings, and St. Leonards.

PURIFICATION OF SEWAGE BY OSIER BEDS.

BY W. E. BUCK, M.A., M.D. (Cantab), M.R.C.P.,
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FOR some years I have been looking out for a system of sewage purification which would be suitable for rural sanitary authorities, and which would comply with the following conditions: I. To produce an effluent water absolutely odourless and clear. II. Not to require any labour except occasional supervision; in fact, to be automatic. III. To pay working expenses. IV. Not to be a nuisance to the neighbourhood. Purification of sewage by means of osier beds appears to be a system which complies with the above conditions.

The sewage of the village of Moulton, in Northamptonshire, is treated in this way, and has been so for over a year. Moulton is a village of 1,700 inhabitants, situated on highish ground; consequently the sewage flows readily to the outfall without the aid of pumping.

The surface-water is excluded from the sewers, so that the sewage is not liable to variation in volume, and is consequently easy to manage. The closet-system of the village may be best described in a negative manner as the water-closet system without any water, the soil in the basin being forced along into the sewer either by slop or refuse water being poured into the basin. I examined several of these closets, and they appeared to answer well, there being no foul smell, and they saved any trouble of emptying. The sewage at the outfall was very black and foul; the effluent water clear as crystal and absolutely odourless.

The osier bed consists of one and a half acres of land composed of porous soil apparently formed of lias detritus; the bed was oblong in shape, slightly sloping from the outfall of the sewer to the effluent outfall, and was ridged at right angles to the carrier.

The carrier was composed of 9-inch sanitary pipes, without collars, divided lengthwise; they are laid with open joints, and with the top of the sides nearly level with the surface of the ground. These pipes were sent whole, but notched along both sides, so that they could be easily halved by a chisel. A round-nosed paddle was inserted between the joints of the carrier to force the sewage over the area destined to be irrigated. This rude valve was but rarely changed, and consequently the sewage went again and again on the same piece of ground for weeks together. I was informed that a pauper had been employed at the rate of 1*s.* per month to change this valve, so as to send the sewage over the whole of the irrigation area, but the guardians refused to grant any out-door relief if the man was earning this pittance, so he gave it up.

I feel convinced that the only thing required to make this osier bed a perfect success and automaton, is a Denton and Field's automatic sewage regulator, or, better still, a duplicate set. The sewage would then be forced over the whole of the area, one part would not be used more than another, and its purifying power would be greatly increased. The ground was planted with osiers of various kinds in March 1876, and on April 23, 1877, they were fit for cutting, and had had no attention save the pauper's at 1*s.* per month, and that only for a short time. The osiers were planted close to each other to prevent their branching, and the distance between each row varied from 2 to 3 feet. The authorities received a bid for these osiers of a year's growth, which was not accepted, but which would have paid a good interest on the land used for purifying the sewage.

The subsoil of the osier bed is drained by 2-inch pipes 5 yards apart and 5 feet deep, connected with a main pipe 6 inches in diameter. So far as one could judge in two visits, half the ground would have been ample to purify the sewage received from the village; indeed, only half the ground is virtually used. There was no smell arising from the bed, and the osiers looked healthy and exuberant.

The osier is a greedy plant, liking both sewage and water, and having a peculiar property of purifying sewage. Another advantage of osiers is this—they grow all the year round, and after once being set, require no more attention till they are cut. In fact they only want sewage to be delivered to them to grow. Almost any soil, except a stiff clay, will suit them, providing it is not absolutely impervious. If in draining a village the sewage can be taken to a plot of land where the subsoil can be drained, and land can be had in proportion of one acre to 1,000 people, osiers will purify the sewage and yield a fair

return; nor will they require any attention if there is a duplicate set of Denton and Field's automatic sewage regulator. It has been urged that if all sanitary authorities in the country take to purifying sewage by means of osiers, that osiers will become so cheap that they will yield no return. Even taking this pessimist view of the question, in which I do not at all share, this way of purifying will then be a cheap one; for supposing one acre of land to purify the sewage of 1,000 people, is it much for these to pay the interest on the outlay of money for the land? That is assuming the osiers grown to be valueless, and in fact growing the osiers to purify the sewage; even then no chemical process can be compared to it for economy and efficiency.

A neighbouring village, Brixworth, is now being drained on the same principle as Moulton, but with less land for purifying the sewage in proportion to the number of inhabitants.

There are certain points about the sewers of Brixworth which are interesting. I. Exclusion of surface water from sewers. II. Pipes laid in right lines from point to point, and wherever there is an alteration in direction or gradient a manhole is placed. III. The sewers are ventilated by placing 6-inch socket pipes vertically on T junctions, and covering with circular perforated plates and cast-iron frames. The frames are set on brickwork and have horizontal bearings to prevent any damage being done to the pipes. They are set in granite pitching, which is half an inch higher than the ventilator; a blind disc is placed underneath the perforated plate to prevent sticks, stones, etc., from being forced into the sewer; around the edge of the disc a margin is left for escape of air or gas. These ventilators are placed at intervals of about seventy-five yards. IV. There are flushing chambers placed at or near the heads of sewers. These chambers are circular wells 3 feet 6 inches in diameter and from 4½ to 5 feet deep, and so holding about 300 gallons. They are placed on the sewer, and the inlet to the sewer, which is in the centre of the floor, is circular and about 9 inches in diameter, and into this a wooden plug is inserted. One plug serves for all the wells, and is furnished with a handle for removing it. The chambers are covered with a stone slab 2½ feet in diameter set in a circular cast-iron frame. The chambers will be filled from an ordinary water cart. The flushing chambers cost about 7*l.* 10*s.*, and the ventilators 16*s.* each. V. The joints were all well puddled with clay. The advantages of free ventilation and flushing are too obvious to need any remarks, and the same may be said with regard to laying the sewers in straight lines and having manholes where there is a change in direction or gradient. But as regards the exclusion of surface water from sewers, I have again and again seen this simple and cheap provision deliberately set aside, so that it would seem as if its advantages were not sufficiently obvious.

In all cases of purification of sewage by land the difficulty of dealing with sewage is not very great when surface water is excluded. All sewage farmers are glad to have sewage when the volume is regular, but if they receive sewage liable to be increased in volume by rain water, they then get an unmanageable quantity of dilute worthless sewage just at the very time when their energies would be taxed even to dispose of the ordinary amount of undiluted sewage. By excluding surface water from the sewers the sewage is delivered to the land regular in quantity and quality, and the sewage farmer can frame calculations as to its disposal. By allowing surface water to get into the sewers, the sewage is rendered worthless as a manure, and unmanageable as regards its disposal. Then as regards small plots of land to be used as osier beds, and which cannot pay for labour to direct the sewage, it is again of the highest importance not to have the volume of sewage liable to be increased, for damage would soon be done to the bed by the force of sewage diluted with water being allowed to pursue its own sweet will. If a small plot of land is to be used for purifying sewage by means of osiers, it should so be arranged that instead of the sewage dribbling on to one piece of ground for weeks together, that it should be regularly distributed over the whole irrigation area. This can only be done by—1. Labourers. 2. The Automatic Sewage Regulator. No. 1 is expensive, and requires supervision. No. 2 is not very expensive at the first outset, and costs nothing afterwards, besides which it is always in action, and distributes the sewage at intervals regularly and fairly over the whole area, and gives the land a time for recovering, thus fitting it for subsequent irrigations and increasing its purifying powers. The only fault I could find with the Moulton osier bed was that the sewage was allowed to run for months on to one portion of the ground, and that the plants away from the carrier did not receive any sewage. The sewage going over the osier bed was the blackest and foulest I had seen, and the effluent water was free from any smell, and as clear and transparent as the water in the stream into which it flowed.

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The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

SANITARY ADMINISTRATION.

II.

IN vindication of the serious charges which we have thought it our duty to bring against the Local Government Board of the present administration, we must now ask the attention of our readers to the actual relation established by the Sanitary Act between that body and the local authorities. With regard to the latter we have no right to assume that the framers of the Act were blind to the very obvious fact that in assigning the duties which they did to local authorities they were demanding from them tasks which they had a vast preponderance of motives for leaving undone, nor is it reasonable to suppose that the Legislature should have passed a complicated Act conferring varied powers and imposing

important duties upon these bodies, intending all the while that the powers should remain unused and the duties unperformed. Hence although the requirements of the Act took a permissive form with the view of leaving to the local authority the largest possible measure of freedom as to the precise method in which it would meet them, Parliament took security, or supposed that it took security, against their complete neglect by means of the clauses conferring upon the Local Government Board the power and the duty of supervising the local bodies in the performance of their work. Let us inquire therefore briefly what these functions of the Local Government Board are, and how they have been fulfilled. Section 299 of the Sanitary Act of 1875 provides that the Local Government Board may cause to be made good the default of a local authority in regard to drainage, water-supply, etc. It is true that this provision is limited by the words 'where complaint is made,' with which the clause is introduced, and many very poor excuses have been founded upon these words by the apologists of the board. Thus it has been argued that the board cannot act except upon complaint made, and that the report of the local health officer (the very man best qualified to make) it is not a 'complaint' within the meaning of the Act. The insincerity of this argumentation is however rendered obvious if we turn to a previous section (293) where the words run 'The Local Government Board may cause to be made such inquiries as they see fit in relation to any matter concerning the public health in any place,' etc.

If words mean anything, there can be no doubt as to the real intention of the legislature in these clauses. They plainly mean that where it comes to the knowledge of the central authority, through whatsoever channel, that a local body is neglecting its duty, it is to step in and supply the deficiency or ensure that it shall be supplied. If this be the object of these clauses, and we are unable to see any other, the mere statement of it is sufficient to show that the Local Government Board has applied itself systematically to the task of defeating that object with singular devotion and very considerable success. It has, as we all know, discouraged health-officers, thrown cold water upon sanitary reform, and strangled improvement of all kinds with red tape with such a tedious and unvarying uniformity that it is hardly necessary to quote instances in illustration of the spirit by which it has been actuated—the experience of most of our readers will supply them by the dozen.

We will, however, refer to three cases which have actually occurred, for the purpose of showing that its success is in some degree commensurate with its devotion to the cause of obstruction and retrogression: (1.) There is a village in one of the midland counties, of which the health officer reported in 1874 that its inhabitants had nothing better than sewage to drink. The local authority was not negligent in this case; but after several attempts to devise a remedy failed to do so, and themselves applied to the Local Government Board for advice and assistance. This was refused, and precisely the same condition of things exists at this moment. (2.) A suburb of a growing town exists within an hour's journey of London which, like many others, instead of being included in the urban district of which it is the offspring, belongs to a rural union whose headquarters are some seven or eight miles off. The authority in this case is remiss and negligent, the place is growing rapidly, rents are rising, and all the ancient abominations of undrained houses, cesspools and wells in close proximity, and such like, are being day by day repeated. All this has been represented in the strongest terms by the health-officer, not only to the local authority but also directly to the Local Government Board, but utterly without result. (3.) In another instance, a local authority, which has had an inspector of more than average intelligence and conscienciousness, takes advantage of the opportunity afforded by the commencement of its duties under the Education Act to divide its district, and combine the duties of school attendance officer with those of inspector of nuisances, and thus to reduce the salary and get rid of an officer whose only defect is the too scrupulous performance of his duty. In this instance, the Local Government Board remonstrates indeed, in words, through its inspector, but failing to persuade the local body, will not back its opinion by acts, confirms the new appointments made in spite of its own remonstrances, and even continues to pay half of the salaries—thus rewarding the local authorities at one and the same time for a retrograde step in their sanitary management, and for treating its own remonstrances with contempt. Cases such as these are so common that we feel some hesitation in quoting them, but that they are so forms the strongest condemnation of the administration under which they are possible. What is the use of an expensive sanitary organisation in every part of the kingdom, if the same infractions of the most elementary laws are permitted for the prevention of which only it was created? What is the use of laborious reports from medical officers of health, if they are to be treated simply as so much waste paper? Above all, what is the use of a Local Government Board with an army of lawyers, inspectors, and clerks, and spending tens of thousands every year out of the public purse, if it either makes no attempt to check the vagaries of incompetent local authorities, or else submits to be treated by them with not undeserved contempt?

THE DANGERS OF THE SEASIDE.

A WELL known ballad pathetically remonstrates with the 'Gentlemen of England who live at home at ease,' on their limited knowledge of the dangers of the seas. Dibdin was probably right in his esti-

mate of the ignorance of our grandfathers on this matter, but their grandchildren, thanks to the efforts of Mr. Plimsoll, are scarcely open to a similar reproach. On the other hand, there is some reason to think that the balance of account is in these days on the opposite side, and that our sailors, whose lives are hedged in by precautions which the rude salts of the Georgian era would have thought grandmotherly coddling, have but a small idea of the sanitary dangers to which we poor landlubbers expose ourselves, even when we 'sit at home at ease,' much more when we weigh anchor and take a cruise for health or pleasure to a seaside watering-place. Honest Jack would be horrified at the various forms of 'land shark,' the epithet which he playfully bestows on terrestrial man-traps of all kinds, that lie in wait at such places to feed upon the unsuspecting visitor. He would scarcely believe that the neat looking cabin, with its trim landlady for a skipper, which looks out so temptingly on the 'sad (in more senses than one) sea waves,' is too often a whited sepulchre of the most odious kind, and that deadly poison is in many cases as regularly 'laid on' for the benefit of its occupants as are gas and water. Nor would his horror probably be diminished if he were told that, in addition to the actual dangers of which possibly his nose might satisfy him if he were to carefully inspect the lower regions of these rotten hulks, it was an even chance that the sheets in which he was invited to berth himself had been quite recently occupied by a patient who was in the peeling stage of convalescence from scarlet fever, or that, only three weeks before, a child had died in them from diphtheria, or from 'diarrhœa,' which, to judge from some recent revelations on the subject of watering-place statistics, appears to be the euphemism adopted by benevolently disposed officers of health for what less accommodating doctors call 'cholera.' The hypocrisy of 'straining at a gnat and swallowing a camel,' with which the Pharisees of Judæa were so bitterly reproached some 1,800 years ago, has certainly not died out with the progress of modern civilisation. It appears to be increasingly the characteristic of legislation in sanitary matters to compound for the shortcomings it has a mind to, by damning with great flourish of trumpets some small and unlucky section of the community it is disinclined to; more especially if the culprits in question happen to exercise no particular influence in the political world. It is on this principle, we presume, that the bargee was singled out by Mr. Sclater-Booth for a sort of legislative *harikari*, at the fag end of the recent session of Parliament, when there was an imminent prospect of the political proprietors of the 'great sanitary mystery' having to face the country with an account of their year's legislation containing not a single item of real sanitary work. Perhaps next year it may be the turn of the seaside lodging-house keepers to be the subjects of a similar specimen of this sort of hit-or-miss style of law making, and in that case they need look for no more sympathy from the general public than the objects of the Canal Boats' Act have received. They have had their 'whack,' to use a phrase which appears to be stereotyped amongst the victimisers of society generally, and they must not be surprised if Parliament should take it into its head in one of the lucid intervals of repentance which may attend the dying days of its next session, to demand some such effectual guarantees from them for the health of those whom they harbour, as the keepers of common lodging-houses are now obliged to give. Whether these spasmodic bursts of hand-to-mouth legislation, which merely touch the fringe of a great subject, and which are only repeating anew the blunder of filling the statute-book with a series of interlacing and conflicting enactments, to which it was hoped that the Public Health Act of 1875 had put a stop, are very creditable to the Local Government Board, as the custodian of the public interests in this matter, is a point on which we shall not offer an opinion here. Legislation in detail appears to be the order of the day, and on the principle that half a loaf is better than no bread, we suppose that we must take what we can get and be thankful.

Meanwhile it may not be out of place to see whether the public have not to some extent a remedy in their own hands for these evils. One suggestion in this direction occurs to us which we will offer for what it may be worth. It is that an organisation should be established in every watering-place, and for the matter of that, in every town of any size too, either of a purely local character, or, what would be better still, in connection with some central body, for the purpose of offering to hotels and lodging-house keepers the benefit of efficient sanitary supervision. Let such an organisation be placed under the management of gentlemen of sufficient local character to give a guarantee of the work which it undertakes being properly done. Let it then offer the benefit of its supervision for a reasonable charge, in the first place to all persons such as hotel, inn, and lodging-house keepers, who live by housing travellers and visitors. If a list of the houses thus placed under the supervision of this organisation were made readily accessible to all persons who proposed to visit the place in question, so that they might satisfy themselves that the house in which they intended to quarter themselves was in a safe sanitary condition, they would then have only themselves to thank if they were to put up at some uncertified establishment and were to discover after being there for a short time that they had fallen into a hot bed of infection. It is, of course, to be understood that the system of registration which would be thus established would be of a purely voluntary character; but, we venture to think that when its existence had become fairly recognised by the public, the indirect compulsion

to avail themselves of it, which would be placed on the persons for whom it was intended, would be so strong that its effect would be quite as useful as if it had been enacted by Parliament, since no hotel or lodginghouse-keeper of any position could afford to allow his name to be absent from the register. We make a present of this suggestion, which we believe to be a thoroughly practicable one, to any of our readers who may be in a position to utilise it, and we trust that in this way another illustration may be afforded of the possibility of superseding the necessity for compulsory legislation by voluntary co-operative efforts.

There is only one objection to the above suggestion that we think it necessary to anticipate, and that is that the work which we have thus marked out for voluntary enterprise is one that ought properly to be undertaken by the local sanitary authority, who are appointed by law the guardians of the public in these matters. We fully admit the force of this objection, and we can only hope that the day may some time arrive when sanitary authorities can be with some probability expected to adopt such a simple system of protection as that which we have suggested. But, as human nature and sanitary authorities are at present constituted, we fear that the prospect of such a consummation is somewhat remote, and the best thing the public can do is to look after their own interests during the interval.

Notes of the Week.

MR. DOSWELL, of Frome, has been elected surveyor and inspector of nuisances to the Ashford local board.

THE cost of carrying out a scheme for supplying Sydney, New South Wales, with water according to the suggestions of Mr. William Clark, will be 1,250,000*l.*

THE Duke of Sutherland's solicitor has had an interview with the Hanley corporation, and agreed to make the injunction restraining them from polluting the Trent a friendly one—not to be put in force for eighteen months.

THE Weston-super-Mare Urban Sanitary Authority have determined to apply to Parliament for an Act to empower them to purchase the local waterworks for 2,000*l.* per annum in perpetuity, to be secured on the rates.

AT the Wandsworth and Clapham Union a letter was read from the Brookwood Asylum stating that no more patients can at present be admitted on the female side of the institution. It was stated that other asylums in the districts were similarly crowded.

THE Walker Local Board, at their last meeting, had under consideration a letter from the Local Government Board proposing to supersede the present Tyne Port Sanitary Authority by appointing first, the corporation of Newcastle-upon-Tyne; second, representatives of all the riparian authorities; third, representatives of the four principal riparian authorities, viz. Newcastle, Tynemouth, South Shields, and Gateshead. After some discussion a resolution in favour of the second proposition was passed.

HUYTON-CUM-ROBY, Lancashire, has been constituted a local government district with a board of twelve members. The first meeting of the board will be held on September 21, unless there should be a contest, in which case the notices for election will be issued on October 26.

THE Shardlow Rural Sanitary Authority has received a letter from the Local Government Board announcing that they will invest the authority with urban powers in all parishes within their district having a population of 600 or upwards.

THE Corporation of Shrewsbury having offered to purchase the local waterworks for 40,000*l.*, subject to mortgages amounting to 6,000*l.*, a general meeting of shareholders has been held to take the offer into consideration, at which it was unanimously agreed to accept it.

FOR some time the working classes residing at Lower Gornal have suffered by not having a supply of pure water, and Lord Dudley, having been informed of this state of things, has instructed the South Staffordshire Waterworks Company to lay pipes on to about 500 houses.

FOR the purposes of warming and ventilation, M. Flavitsky uses double windows, placing an air-chamber under each window, into which the fresh outside air is admitted, and heated by ribbed tubes, by means of water or steam. The hot air rises between the windows, and enters the room near the ceiling.

AT the West Powder Petty Session, Truro, on Saturday, Mr. M. T. Hutchins, of St. Agnes, was fined 10*l.* and costs for allowing certain shafts upon Perran St. Georges Mines, Perranzabuloe, to remain in an unfenced and dangerous state. The prosecution was instigated by Dr. Le Neve Foster, inspector of metalliferous mines.

IN consequence of the local board of St. Columb, Cornwall, refusing to provide an efficient system of sewage in accordance with the requirements of the Local Government Board, notice has been given by the Government department that they intend to hold an inquiry with a view of dissolving the local board.

AT the monthly meeting of the Swinton and Pendlebury local board, the chairman, Mr. Midgley, referred to his visit, with others, last autumn to the sewerage farm of Colonel Jones at Wrexham, and said it was kept in a most efficient manner. As the board were about to utilise their farm, he thought it would be well if the surveyor were authorised to go over to Colonel Jones's farm and see the principle on which it was worked. A resolution authorising the surveyor to go was passed.

THE 'Narrative of Facts for 1877,' relative to the Ashley Down Orphan Houses, has just been issued by Mr. George Müller. The total of the income during the past year was 41,500*l.* 'If,' says the report, 'this income of 41,500*l.* during the past year is added to the income during the previous years, it will be seen that we have received altogether, simply in answer to prayer and the exercise of faith, without applying to anyone for anything, 750,000*l.* sterling.'

VERY decisive precautionary measures are to be taken in regard to the French ship *Correze*, in which there has been a serious outbreak of cholera during her home passage from China. As soon as she arrives in the Mediterranean she will be signalled to remain off the Hyères Islands; two ships will then be sent to take off her passengers and crew, who will go into quarantine; the *Correze* will then be sunk for a time, as will also the two other vessels employed to transport her crew and passengers to land. By these means it is believed that all danger of a spread of the disease will be averted.

PREPARATIONS are being actively made for the demolition of the eastern side of Middlesex Street, better known as Petticoat Lane, comprising a number of thickly inhabited dwellings, it being proposed to erect a number of blocks of houses on the Artisans' Dwellings scheme, and also to widen various thoroughfares, and effect other improvements in the locality.

INTERMITTENT FILTRATION AND IRRIGATION COMBINED.

THE Commissioners of Police of the town of Forfar, in Scotland, have determined upon adopting this mode of treating the sewage of their district, and have engaged Mr. Bailey Denton, of Whitehall Place, to report on the proposed works. As one of probably the earliest movements in the way of river purification in Scotland, this decision is worthy of special notice.

POPULATION AND DEPOPULATION.

THE last annual report of M. Devilliers to the Académie de Médecine gives some interesting details, showing that the average mortality of infants under one year old was 14 per cent. when nursed by their mothers, and 26 per cent. when brought up with the bottle by their mothers. It is satisfactory to find that under the increasing pressure of medical warning and growing public opinion there is in most districts of France a growing increase from year to year in the percentage of mothers who nurse their children.

UNWHOLESOME COLOURING MATTER.

THE Medico-Practical Society of Paris has been investigating a proposition of Messrs. Collineau and Savigny to substitute for the poisonous colouring matters now so largely used in the industrial arts productions of vegetable origin and of perfect harmlessness. *Cauline*, the substance studied, is extracted from common indigenous plants. With alkaline earthy salts it gives a series of greens; with salts of tin it gives a series of colours varying from the most beautiful violet to a tender rose; in contact with picric acid it strikes a green as fine as that which picric acid gives with indigo.

SUGGESTION FOR A POLICE AMBULANCE CORPS.

AT the conclusion of an inquest on a man who died through a fall, and was removed to the mortuary on a stretcher by four policemen, Dr. Hardwicke remarked that a great deal of the time of the police was unnecessarily employed on such duties, to the neglect of others of more importance. What was wanted was an ambulance corps attached to each station, with a light running vehicle, covered with a hood, and a mattress with light springs. These would be of immense service in removing the sick, the wounded, the drunken, or the dying, to the hospitals, or elsewhere, in a more humane and expeditious manner than under the present system. The plan was common in other countries, and should be tried in our own.

WHY REGISTRATION OF DISEASE IS NECESSARY.

DR. COLLIER, medical officer of health to the Fulham District Board of Works, at the meeting of that board, reported that during the past month twenty-four cases of small-pox had occurred in the district. Fourteen of the cases were reported from one street—viz., Rectory Place, Walham Green, where the outbreak had been so serious that a public-house there had to be entirely closed, and many other houses also, scarcely a house being free from it. He attributed the spread of the disease in this street to the fact that he was not informed of its first outbreak there till a fortnight after it had occurred. He went there immediately, and found a woman, who had been the first person attacked, just recovering and sitting in her own room, among a number of neighbours who had called to congratulate her on her convalescence. The woman was then in a most dangerous condition for spreading the disease, and the consequence was that the infection was conveyed to the houses of her visitors, and shortly afterwards four deaths took place. The report was referred to a committee.

THE LEA CONSERVANCY.

WE have just perused again the 'cautions' given to the public, by the sanitary engineer of this board, Major L. Flower, so well-known to many of our readers, and we wish that a similar strictness were insisted upon generally. There is, for instance, a fine of 100*l*., and 50*l*. per day afterwards if any one opens any sewer into the River Lea or any of its tributaries, if any one suffers sewage to flow into the Lea or tributaries through any sewer; if any one opens any sewer into any ditch or channel communicating with the River Lea or tributaries, or suffers sewage to flow into any such ditch or channel. A fine of 10*l*. and 5*l*. per day afterwards is also charged upon any one who places any manure heap, or collection of offensive or injurious matter, so that it can drain into the Lea or tributaries; whilst any person caught throwing into the Lea or tributaries any dead animal, filth, or other noisome thing, or who shall wash or cleanse therein any animal, cloth, wool, leather, or skin whatsoever, is fined 5*l*. for every such offence. And in order that the mischievous or designing may not fancy that these cautions are issued merely as a matter of routine, the major gives further notice that the conservancy board will vigorously prosecute all persons infringing in any manner the provisions of the said Act or any by-law. This looks like business.

RIVER POLLUTION.

THE commission for the purification of our rivers has already received some very good advice, in the form of a letter to the editor of the *Times*, from Mr. G. W. Bell. There are many sanitary reforms which are so gigantic in their proportions, involve such a large outlay of money and labour, prejudice so many vested interests, and are so doubtful in their results that, by their very nature they paralyse action. Others, however, are still wanted, in themselves easy to be dealt with, which nevertheless promise improvements which are certain. One of these has been pointed out by Mr. Bell, which will forcibly come home to many at this season of the year. Why are the beautiful rivers of this country to be recklessly defiled by the use of the old fashioned and filthy privies almost universally used in country places? The remedy suggested by Mr. Bell is to abandon the idea of permitting water to be used for cleansing closets, and to introduce in all country places the earth closet in its place. He says: 'It is to be hoped that the new commission will take the early and easy step of issuing simple printed advice as to the erection and use of earth and cinder closets, and distributing these widely throughout the country. In the metropolis and in the large towns these may be impracticable, or at least not easy to manage; but in rural districts I am bold to assert that there is no other wholesome system, and that none other must be permitted.' We entirely endorse these remarks.

BRAKES UPON RAILWAYS.

ACCORDING to Sir Henry Tyler, 600 deaths during the last twelve years have been caused by railway accidents, of a kind which the use of proper continuous brakes would have averted. After such a statement from so high an authority, surely Parliament will next Session compel the attachment of efficient brakes to all trains conveying human passengers. An accident which occurred to a Midland Railway train at Leeds the other day, has proved more efficient than whole volumes in pointing out the value of such a brake as the Westinghouse Automatic Air-brake. The driving axle of the leading engine had broken in two, and a driving wheel projected some 150 yards distant. The engine was

wrecked and the rails twisted, and yet, on the application of the full force of the brake by the driver—the carriages retaining their upright position—the train was brought to a dead stand-still in 100 yards, that is 50 yards inside where the driving-wheel had been hurled. Not a person was hurt. Nor was, it seems, the effect of the brake confined to its action upon its own train. A down train was due at the spot, and persons who had alighted ran forward to stop it, being barely in time to do so. If they had been too late—and they would have been too late if the up-train had been wrecked, or leisurely stopped—the down train must have come into collision, and would probably have been thrown off the line, with dreadful results. It is impossible, says the *Times*, to conceive circumstances in which all the conditions necessary to a great catastrophe should be more completely fulfilled, and yet they were all rendered harmless by the brake.

THE DRAINAGE OF BOURNEMOUTH.

SIR JOSEPH BAZALGETTE, C.E., who has prepared plans for the drainage of the eastern portion of Bournemouth, including an important district recently added, has had an interview with the Improvement Commissioners of that town. Sir Joseph's scheme is that all the drainage of the western and central portion shall be diverted from its present outfall and taken to Boscombe, a distance of about 2,000 yards to the eastward, and there discharged into the sea, after receiving the drainage of the eastern district. The inhabitants of Boscombe strongly objected to this scheme, and Mr. Thornhill Harrison, one of the Local Government Board inspectors, after holding an inquiry, reported in favour of two outfalls, and took other exceptions to Sir Joseph's plan. The Improvement Commissioners are divided in opinion on the subject, but the majority have passed a resolution in favour of one outfall. Subsequently Sir Joseph Bazalgette went in detail through Mr. Harrison's report, and expressed his conviction that his own scheme would be found to work best for the interests of the town and neighbourhood. He promised to embody his views in a report to be presented to the Commissioners at their next meeting.

MODEL BY-LAWS OF LOCAL GOVERNMENT BOARD.—No. 6.

THIS number is devoted to the consideration of slaughter-houses, and are drawn up under the powers of the 169th Section of the Public Health Act, 1875, which incorporates the provisions of the Towns' Improvement Clauses Act, 1847 which are reprinted in the memorandum prefixed to the by-laws. The section enacts that the urban sanitary authority shall from time to time make by-laws for regulating the licensing, registering, and inspection of slaughter-houses, for preventing cruelty therein, and for keeping the same in a cleanly and proper state, and for providing a sufficient water-supply. The memorandum also informs the sanitary authorities that they can require that (*a*) a slaughter-house shall not be erected within 100 feet of a dwelling-house, (*b*) that it shall admit of free ventilation on two sides at least, (*c*) that no part shall be underground, (*d*) that the approach thereto shall not be at a greater incline than one in four feet, and shall not be through a dwelling-house or shop, (*e*) that there shall not be a loft or room over it, (*f*) that an adequate tank and water-supply shall be provided, (*g*) that it shall be well paved with asphalt or concrete and be properly drained into a gully covered with a grating, (*h*) that the interior walls shall be covered with a hard smooth impervious material to a sufficient height, and (*i*) that no water-closet, privy or cesspool shall be within or communicate with it, also that the lair shall not be within one hundred feet of a dwelling-house and shall be properly paved, drained, and ventilated. In addition it is provided by the by-laws that every person applying for a licence to erect a slaughter-house, shall fill in a form of application such as is printed in the by-laws; and also every person applying for a licence for its use and occupation shall fill up another form, and on being licensed is to receive a form of licence such as that prepared for the sanitary authority. There are also by-laws requiring the occupier to admit the medical officer of health and inspector or surveyor; to provide water for the cattle whilst in the lair, proper instruments for slaughtering, and generally to carry out the above-mentioned provisions, by removing blood, filth, etc., in properly-constructed vessels within twenty-four hours after slaughtering, under a penalty not exceeding 5*l*.

These regulations are in most cases taken from those issued by the Metropolitan Board of Works, after having been confirmed by the Local Government Board, but in some instances they are in advance of the regulations in force for the metropolis, as in London it is not illegal to drive animals through a dwelling-house or the shop; to have a lair near a house, or to erect a slaughter-house as close as 40 feet to a dwelling-house, so that it is probable in a few years that the present metropolitan regulations will be amended to agree with those just issued by the Local Government Board.

Special Report.

THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

ON THE LONDON WATER-SUPPLY, by Mr. F. J. BRAMWELL, F.R.S., and Mr. EDWARD EASTON.

PROBABLY some of the members present may know that we have (in conjunction with Sir Joseph Bazalgette), at the request of the Metropolitan Board of Works, recently reported upon the water-supply to London, especially in relation to the quality of the potable water and to the provision of water at an adequate pressure for the extinction of fires. We make no apology for bringing the subject of the London water-supply before this section, because that subject is an extremely large one, and the questions involved in its economic consideration are, therefore, of very considerable importance. In 1874, the population supplied was 3,655,000, dwelling in 511,000 houses. The daily average quantity throughout the year was 116,250,000 gallons. The quantity per head, therefore, for all purposes was a little under 32 gallons. As is well known, this water-supply is in the hands of eight companies. The aggregate capital employed in 1874, including share and loan capital, was 11,196,000*l*. The gross income from water was 1,137,000*l*.; in addition to this there was 16,000*l*. from land rents—making a total of 1,153,000*l*. The expenses were 447,500*l*. The net income was 705,700*l*., giving rate of interest upon all the capital employed, share and loan together, of proximately 6·3 per cent. In Colonel Bolton's last report, June, 1877, it is stated that the population supplied was 3,796,000, dwelling in 533,000 houses, and that the average daily quantity was 132,500,000 gallons, equal to a little less than 35 gallons per head during this summer month, and representing a probable average daily delivery throughout the year of from 120,000,000 to 125,000,000 gallons. London, in common with other towns, requires water for the under-mentioned purposes:—(*a*) drinking and culinary; (*b*) cleanliness—personal, domestic and civil; (*c*) extinction of fires; (*d*) manufacturing; (*e*) road watering and miscellaneous. With respect to the heads (*b*) (*d*) and (*e*) we believe that the present water-supply is generally satisfactory; but except in rare cases this cannot be said with respect of head (*a*), nor in any case can it be said in respect of head (*c*). The importance of these two heads it is difficult to exaggerate, as on the quality of the potable water depends to a large extent the health of a vast population, and on an adequate provision for the extinction of fire depends the preservation of the largest aggregation of wealth in the world. With respect to head (*a*), we have already shown that there are in London close upon 4,000,000

of human beings who should be supplied with wholesome potable water; let us now see, as regards head (*c*), what is the mere money value of the property requiring protection from fire. This subject of fire extinction has frequently been the subject of Parliamentary consideration—in 1862, in 1867, and again in 1876 and 1877. In these later years a committee, presided over by Sir H. Selwin-Ibbetson, has made the fullest investigation into the question of the Fire Brigade and into the means of extinguishing fire in the metropolis. From the evidence given before that committee it appears that as much as 540,000,000*l.* of London property is insured in the fire offices. With respect to the uninsured property there is a great diversity of opinion. No witness puts it lower than equal in amount to the property insured; so that no one gives the total value as being much less than 1,100,000,000*l.* But other estimates made the proportion as much as one insured to four uninsured; the total value of the property, therefore, according to those estimates, amounts to 2,700,000,000*l.* Captain Shaw's opinion, however, is, there is one-third insured and two-thirds uninsured. If he is right, then the total value of the property of London is a little over 1,600,000,000*l.* To revert to (*a*) potable water. One of the writers of this paper is old enough to remember the wheels at London Bridge pumping up the water of the Thames as it flowed past them, and delivering it direct into the houses of the inhabitants; and even within thirty years some of the companies took their supply from the Thames opposite—what was then Hungerford Market, from the Dolphin at Chelsea, from Hammersmith, and from Kew; but year by year the river got more foul and the population became more critical. Complaint was made as to the quality, and as the companies from time to time came to Parliament for further capital to meet the increasing wants, conditions were put upon them which have resulted in all the companies who derived their sources of supply from the Thames taking that supply from above Teddington Weir, so as to be out of the tidal influence, and in the employment of depositing reservoirs and filter beds so as to get rid, as far as possible, of all foreign matter. But in spite of all this the public is not satisfied. Occasionally the water is declared on authority by Colonel Bolton, in his monthly reports, to be turbid, and in his report (for June already quoted) Dr. Frankland says that the suspended matter in the water supplied by one of the companies was full of moving organisms. Naturally, the public, even after all that has been done, are not satisfied as regards the supply of potable water. Nor do we believe that they ever will be satisfied, or can be satisfied so long as that water is derived from rivers into which is poured the sewage of a great part of the large population of the basins of the Thames and of the Lea, and also the surface drainage from the highly cultivated and therefore highly manured land of those basins. With respect to fire extinction, nothing at all has been done by the water companies beyond the giving of a supply of water at street levels, to be picked up by the pumps of the fire-engines and pumped upon the fire. Captain Shaw has said in his evidence before the late committee that his requirements, even at the largest fires (which requirements he calls very moderate), amount to no more than 2,000 gallons of water per minute, capable of being played upon the fire through lengths of hose not exceeding in the aggregate half a mile—that is, through 14 hoses of 200 feet each, each hose conveying 150 gallons per minute. And yet he says that in many instances this moderate quantity cannot be obtained. It appears that the volume of water used annually in London for the extinction of fires is only 1-400th of the total supply—that is to say, not one day's water is used for extinguishing fires in the year. But it must be remembered that fires do not burn with average regularity throughout the year, throughout the day, and throughout the metropolis, but that they break out at intervals and at particular spots, and, therefore, this comparatively small annual percentage has to be delivered, not as a regular percentage of the usual delivery, but in quantities vastly in excess for the moment, if anything, required for the locality in which the fire may be raging. Two thousand gallons per minute is at the rate of about 3,000,000 gallons in the twenty-four hours—that is to say, when a large fire occurs there should be concentrated at the particular spot a rate of delivery equal to 1-40th of the whole power of the London water-supply, or enough to meet the ordinary daily wants of a town of 100,000 inhabitants. Bearing these facts in mind, it is not surprising that the pipes of the companies, which have been laid with a due regard to economy of capital, large enough merely to supply the needs of the houses—these needs being at the average rate of a pint and a quarter per minute per house, or 227 gallons per house per day—should be inadequate, in many instances to bring to the scene of a fire 2,000 gallons per minute, even when delivered at the level of the street for the services of a fire-engine. But there can be no question that to ensure the prompt extinction of fire it would be in the highest degree desirable to be able to apply an effective jet from the water main, without the intervention of a fire-engine. This has been amply proved by the experience of Manchester, Liverpool, and other towns, where there is, by gravitation in the mains, a constant high pressure, competent to deliver large quantities of water in the form of jets. This section is not one which deals with engineering matters, but we think we may be pardoned for making a few remarks upon the subject of jets. The Metropolitan Board of Works, in its desire to do that which is best for the safety of the inhabitants of London and to do nothing rashly, more than twelve months ago instructed us, in conjunction with Sir Joseph Bazalgette, to carry out a series of practical experiments upon the question of fire jets, which should put beyond all doubt the engineering points involved. We may state briefly the result of these experiments. With a very low jet, say of some 30 ft., about seven-eighths of the head or pressure effective at the orifice of the jet will be obtained, as the height of the column of water—that is to say, 40 ft. of head at the orifice would give a jet of about 35 ft. in perfectly still air; but as the heights of the jets are increased, and increased they must be, if they are to be of any service in extinguishing fires in the most valuable buildings of London, the modern buildings, which are so lofty, the percentage which the column of water produced bears to the effective pressure producing it becomes less and less, so that for a jet to rise to a height of 80 ft. there must be, roundly, a pressure equal to 128 ft. To rise to a height of 100 ft. there must be an effective pressure of about 180 ft. Moreover, the higher the jet the greater must be the diameter of the column of water. A small jet, which will attain a respectable percentage of the head producing it, if that head be low, will be unable to cope with the resistance of the air, if the pressure be high. We do not suppose that the section will care to go into details on this matter; but we will give them as an instance, a fair average jet required for London purposes. A jet that would rise 80 ft. in still air, if of 1 in. in diameter, would deliver the 150 gallons per minute, and would demand an effective pressure, as has already been said, of 128 ft. at the very orifice of the jet; and it might be thought, therefore, that if a pressure could be maintained in the pipes equal to 128 ft. of head, when the water was flowing, that all that was desired would be provided. But this is not so. There is the very striking and to many people very unexpected consideration of the friction of the water through the hose to be taken into account; and the section may, perhaps, little expect to be told that every foot of the usual size of hose employed by the London Fire Brigade, when conveying 150 gallons of water per minute, requires a pressure of a little over 3 in. to drive that water through. As a matter of fact, the 200 ft. of hose demands 53 ft. of pressure to get 150 gallons per minute through them. Therefore, to obtain a jet of 80 ft. high, expending 150 gallons of water per minute at the end of 200 ft. of hose, there is needed a

pressure at the main of 181 ft., and this pressure must be maintained while the water is flowing. We believe the section will now well appreciate why it is that if it be difficult for the water companies in many instances to deliver 2,000 gallons per minute at the street level, it would become absolutely impossible for them to deliver it were its exit opposed by this 181 ft. of pressure. More especially will the section understand the difficulty when they are told that there is not one of the London companies which is bound to give throughout its district this pressure of 181 ft. above the pavement, or anything bordering upon it; indeed, the obligations of the largest company but one are fulfilled by giving a pressure of only 40 ft. above the pavement—a pressure which, so far from being able to produce a jet delivering 150 gallons at the end of 200 ft. of hose, can only succeed in driving 122 gallons per minute through a hose of that length at the ground level without any jet at all. These things being so, we think that upon this point of the extinguishing of fires London will no longer be content with the provisions, as regards quantity and pressure, which now prevail. The question now arises, how are the legitimate complaints as regards potable water and water for fires to be met and to be satisfied? There are many who suppose that the defects arise solely from the fact of the supply being in the hands of private trading companies, and who urge that if the undertakings of those companies were acquired by the governing body of the metropolis, so as to put the whole water-supply under one management, every complaint would disappear. But this could not be the case if, after the acquisition of the property by the governing authority the present system were continued. That system, as is well known, is the obtaining of water for all purposes, either from the Thames, the Lea, or from wells. With the exception of the well supply, the water so obtained is, as we have said, put into depositing reservoirs and is filtered, and is thus treated whether it be used to flush a sewer or whether it be drunk, and is delivered at one and the same pressure, whether it be required at the basement of a house or for the extinction of a fire. Suppose the governing authority to pursue the same system and to obtain water from the same sources, obviously, though there might be some economy in management, there would be no radical change either in quality for drinking or in the quantity and pressure for fire purposes. The mere fact of corporation ownership does not change either quality or pressure, although this simple truism is very commonly overlooked. What, therefore, would be the position of the governing authority? They would speedily find they had bought a 'white elephant,' the possession of which would, under any ordinary system, compel them to set about finding some unobjectionable source of supply, so that all the water might be fit for potable purposes, and would compel them to alter the pipage and also to increase the height to which the water is raised that it might be available for fire purposes. It is commonly a sufficiently difficult thing to find an unobjectionable source of supply for a town of even 100,000 inhabitants; but in the case of London the difficulty of procuring 125,000,000 gallons a day is one of the greatest magnitude. There have been, as the section well knows, various propositions for bringing the water from the Lake Districts of Wales and Cumberland by means of gigantic aqueducts to London; but, after full examination by Royal Commissions, these propositions have been rejected; and, moreover, an opinion has been expressed by those Commissions that it is not expedient the water-supply of any district in England should be taken from the towns in its immediate neighbourhood to supply the wants of a town afar off. But assuming that such works could be carried out, the very projectors of them admit that their cost would be enormous. Moreover, they could not deliver the water at a height which would give sufficient pressure without the aid of pumping. The whole of the pumping expenditure, therefore, must be maintained, or if an adequate pressure is to be kept in the mains for fires, must be extended. Would it be wise for the metropolitan authority to acquire at a cost which from numerous instances we could readily show to the section would not be less than 25,000,000*l.* sterling, the undertakings of the present companies when that acquisition was burdened with the necessity of forthwith discarding the sources of supply and of forthwith entirely rearranging and modifying all the distributing apparatus and all the pumping power, at an expense of at least as many millions more? We need scarcely say that, rich as London is, such outlays would never be sanctioned. But it is evident that something must be done. London must be supplied with wholesome, potable water, and it must have a greater security from fire. We have reported to the Metropolitan Board of Works, and our report is before the public, that the only practical mode would be to separate the water for drinking purposes and for the extinguishment of fire from the water which is used for all other purposes. Although, as we have said, it is next to impossible to find 125,000,000 gallons per diem of unobjectionable water, it is perfectly possible to find 30,000,000 gallons per diem, or even more than that quantity of water, which is pronounced by all authorities to be of the best possible quality for dietetic purposes—viz., the pure spring water from the chalk. This has been recognised by the Duke of Richmond's Commission in their report. Now it will be found that the most liberal allowance of water for drinking and cooking is covered by two gallons per head per diem. And by cooking we mean, not only the water used in the saucepan, but the water used in the washing of vegetables and fish, and in otherwise preparing food for cooking. Two gallons per head per diem is only 7,000,000 or 8,000,000 gallons for the whole metropolis. But in our report we have doubled this, and have allowed 16,000,000. Our proposition is that there should be made on the high ground to the north and to the south of London reservoirs at a height of 400 feet above ordnance datum; that these reservoirs should be supplied by pumping engines, drawing their supply of spring water at distances of from 8 to 15 miles beyond the reservoirs—that is to say, in the open country; that the reservoirs should all be united by large arterial mains traversing London from north to south, and that these mains should be united by subsidiary mains. From these latter mains a service pipe would proceed to each house, delivering the water into a close vessel having a draw-off tap, and containing, according to the size of the house, from 3 to 10 gallons and filling up gradually, after having been emptied. On these mains also would be placed, at the time they were laid down, the hydrants for fire extinction. The plan we have proposed would, we believe, overcome every difficulty in providing for the important requirements of (*a*) the potable and (*c*) the fire extinction water; and even if the property of the water companies were acquired by the governing body, this plan, as it seems to us, is the only feasible one by which the present complaints could be satisfied. If this be so, why should not the plan be at once carried out, leaving the question whether the companies should or should not be acquired by the governing body for after consideration? The two things are distinct. The acquisition of the water companies would be strenuously resisted. It would probably involve years of Parliamentary warfare, and during the whole of this time London would be left where it is as regards its water-supply. After very careful calculation we have estimated that the total cost of the whole of the works necessary for carrying out this separate supply of potable water, under sufficient pressure for extinguishing fires, will not exceed 5,500,000*l.*, and this includes the house fittings and also the hydrants. The annual cost attendant upon such a capital expenditure and upon the working of the undertaking will at first sight appear to be large, but, when contrasted with the expense which would be involved in meeting the improved fire requirements alone under any ordinary system, that cost will be found to be considerably less. The evidence adduced before Sir H. Selwin-Ibbetson's

Committee showed a very curious state of facts as regards the small annual money expenditure for the preservation of London from fire as compared with other places. For the protection of the 16 hundred millions of property in London there is accorded an annual sum of a little under 80,000*l.* Of this 80,000*l.*, 48,000*l.* arise from a halfpenny rate, 19,000*l.* from a contribution by the Fire Offices, at the rate of 35*l.* for each million insured, 10,000*l.* from the Government, and 2,750*l.* from miscellaneous sources. Let us see now what proportion this sum of 80,000*l.* per annum for the preservation of London from fire bears to the sums expended in other large towns, and the best way of comparing will be by taking the expenditure at per thousand of the population. London, with a population of, say 3,500,000 and an annual charge of 80,000*l.* spends 22*l.* 17*s.* per thousand. Paris, with 1,986,000 of population, spends 100,000*l.*, or 50*l.* 0*s.* 6*d.* per 1,000. New York, with 1,098,000*l.* spends 249,600*l.*, or at the rate of 233*l.* 14*s.* per 1,000—more than ten times the sum spent in London. Chicago, with 550,000 of population, spends 111,093, or exactly 202*l.* per 1,000. Numerous further instances might be quoted, all of which would tend to show that London, although undoubtedly the most important city in the whole world as regards population, wealth, and magnitude of the interests involved, is the one that spends relatively the least for the extinction of fire. That London, in such circumstances as these, should suffer so little as it does from disastrous fires, we think must be admitted to be due to the excellent organisation of the Fire Brigade and to the unwearying diligence and assiduity of Captain Shaw. The London Fire Brigade, under his management, has gone on from year to year coping with and even mastering the increase in their labours arising from the increase of London. But it is clear that there is a point beyond which it is impossible for them to protect the metropolis unless in some way their powers are increased. This point is certainly reached now, and in fact has been reached for some time past. The report of Sir H. Selwin-Ibbetson's committee clearly recognises this, for they have recommended in their report that the limit of the rating power for fire purposes should be doubled, thus adding nearly 50,000*l.* per annum to the present income. That committee further recommends that hydrants should be fitted to mains and services wherever there is a constant supply, and should follow the extension of that supply; this, as appears from the evidence, would involve an expenditure of 750,000*l.* at least, which, at 3½ per cent., would cost 26,250*l.* per annum. They also recommend that the water system should be consolidated in the hands of a public authority, which, in dealing with the questions of constant supply, pressure, and pipage, should be bound to have regard not only to the convenience of consumers, but also to the requirements for the extinction of fire. This alteration of pipage means the outlay of an unknown sum, certainly not less than one million or an annual charge of 35,000*l.* It further means the increase of pumping power at an increased cost, stated in evidence before this committee, of 150,000*l.* per annum, but it has also been shown by the engineers of the water companies and we entirely agree with them, that it would be idle to pretend to maintain such a pressure until the house fittings were all altered to suit it, and this could not be effected for less than 3,600,000*l.*, which, at 3½ per cent., amounts to 126,000*l.* per annum. These are the sums involved in the recommendations of Sir H. Selwin-Ibbetson's Committee, who conclude their report by saying that "effect should be given by the Legislature to these recommendations." Let us now contrast the financial results on the two plans: Purchase of the undertakings of the water companies, 25,000,000*l.*, at 3½ per cent., 875,000*l.*; alteration of pipage, 1,000,000*l.*, at 3½ per cent., 35,000*l.*; annual expenditure of the companies in 1874 was 447,529*l.*; say diminished, owing to the concentration of management, 47,529*l.*; leaving 400,000*l.*; increased cost of pumping for higher pressures required for jets, 150,000*l.*; interest at 3½ per cent. on cost of hydrants, 26,250*l.*; interest on cost of altered house fittings, 126,000*l.*—total, 1,612,250*l.*; equal to about 16½*d.* in the pound on the present rateable value of the metropolis. We should mention that we have not included among these items the extra 50,000*l.* a year expenditure on the Fire Brigade contemplated in the report of the committee, because we are convinced that if a hydrant service with proper pressure be given, not only need there be no increase in the annual charge for the Fire Brigade, but the existing expenditure will be very considerably lessened. The annual cost of the plan we propose is—interest at 3½ per cent. on 5,500,000*l.*, 192,500*l.*; working expenses for pumping and management, 32,500*l.*—total, 225,000*l.* Equal to about 2¼*d.* in the pound on the rateable value of the metropolis. The gross income of the water companies in 1874 was, as we have stated, 1,137,000*l.*, or about 11½*d.* in the pound, making, with the 2¼*d.*, a total of 14*d.* in the pound, as against 16½*d.*, or a saving in mere money of 2¼*d.* in the pound, or close upon 25,000*l.* a year. But it will be seen that by the dearer process, no improvements whatever has been made in the quality of the drinking water, and that nothing has been attained except a better provision for the extinction of fire, whereas by the cheaper plan not only has this latter object been attained, but the difficulty with regard to the most important question of all, that of potable water, has been entirely overcome.'

The discussion was opened by Captain Douglas Galton, who expressed his entire approval of the system of separating the potable water from the other supply and maintaining it at a proper pressure for extinguishing fire. He believed, however, that the large numbers of fires in America mentioned was greatly due to the dryness of the atmosphere, and the prevalence of timber structures.

Mr. Park Neville, engineer of the Dublin Corporation Waterworks, followed, and stated that he believed the plan of separation proposed was the only solution of the difficulty in London.

Dr. Farr, in the course of his remarks, said it was clear that satisfactory water could never be got from the river Thames. He, however, would recommend, even on culinary grounds, that the water should be softened by Clarke's process.

Sir J. Watson, late Lord Provost of Glasgow, believed the plan of separating was the one to be followed. He stated that lately in Glasgow even, with a large supply from Loch Katrine, the Corporation had found it expedient to economise the water by taking inferior water from the Clyde and distributing it by separate means for manifold purposes.

Mr. E. Easton, one of the authors of the papers, with reference to the remarks of Dr. Farr, said that from a very considerable experience in the supply of chalk waters to different towns—Brighton, Ramsgate, and others—he did not believe that the softening of water was of so much importance as was frequently supposed. The chief value of softened water was in its being better adapted for washing, to which the plan proposed had no reference whatever, but there was nothing to hinder the London companies from softening the barky water.

Mr. Baldwin Latham said it was very difficult to say what really was good water and what was bad, as when in January and December last Dr. Farr was reporting a low death-rate, Dr. Frankland concurrently reported that the water-supply by the companies was entirely unfit for drinking purposes. At the same time, however, he thought that great care should be exercised in choosing the site from which the water should be got in order that it might be of the best quality.

Earl Fortescue, the President, expressed his general concurrence with the plan, and thanked the authors of the paper for a contribution which, he said, was one that added lustre to the section. He added that in the county of Devon the propriety of reserving a high quality of water for drinking purposes was so well understood that the

farmers and cottagers distinguished them as 'Potwater' and 'Stopwater.' As regarded the outlay, his lordship called attention to the fact that looking at the immense value of the property in the Metropolis, as stated in the section, an apparent large expenditure would prove to be the truest economy.

Mr. Bramwell, not desiring further to occupy the time of the section, briefly replied, and stated that he believed that the speakers had given him very little to answer, the only point being that of the softening of the water. If desirable, this might be effected at an annual cost not exceeding 10,000*l*., but he was quite sure there was no need of softening it for drinking purposes merely, and as regarded tea-making, if one wished to get the real delicate flavour of the tea it was best obtained by the use of hard water. If, on the other hand, it was desired to get a good dark, strong, family brew, probably soft water was the best, as it extracted not only the flavour of tea, but that which Mr. Bramwell stigmatised as the flavour of stick.

A cordial vote of thanks was given to Mr. Bramwell and Mr. Easton for their valuable paper.

MECHANICAL SECTION.

'On a new mode of circulating hot water through very large buildings, and upon a new mode of softening water, as carried out at the New Lunatic Asylum (the third) for the county of Middlesex, situated on Banstead Downs, in Surrey.' By Mr. F. G. Brampell, F.R.S.

The author stated that this asylum extended over many acres, comprising as it did numerous separate 'blocks,' as they are technically called, for the reception of the patients, for infirmaries, the administration department, and other purposes. In order to obtain economy and simplicity in management, it was desirable that the whole of this extensive acreage of buildings should be heated and supplied with hot water for baths and other purposes from one source of heat. It was well-known that in a single house, or even in a single large building, the circulation of hot water could be automatically maintained by the mere difference in gravity between the hotter ascending column of water and the cooler and heavier descending column. The power thus obtained, however, was wholly inadequate to cope with the thousands of yards—miles, indeed—of pipes at Banstead. To overcome the difficulty and to enable the building to be warmed and supplied from a single source of heat, the author had devised the plan of placing in the engine-house a centrifugal pump, which forced the water along the outgoing main and exhausted it along the return main. These mains were conveyed side by side in trenches throughout the whole enormous establishment. They were not connected at their ends, but at each block of buildings a pipe, controlled by a valve, led the hot water into that block and supplied the whole of the heating coils therein, the outlet pipe from this system of coils being united to the return main. Thus the water circulates through each block with the velocity due to the difference of pressure between the outgoing and the return mains, instead of circulating with the feeble velocity arising from a mere difference in temperature. It would be seen that there was practically no waste of fuel in the employment of steam to work the centrifugal engine, because the waste steam of the engine was used to aid in heating the water. The author of the paper proceeded to point out how this system of forced circulation would render it possible to lay on to groups of buildings, such as streets of workmen's dwellings, a supply of hot water for heating their dwellings and for washing purposes. The water was pure spring water obtained from a deep well in the chalk. This water was about 17 degrees of hardness, and was therefore a perfectly fit water for dietetic purposes in its natural conditions, but on being boiled it deposited the carbonate of lime in the boilers and pipes through which it was conveyed, and thus the author of the paper was led to urge upon the magistrates the necessity, if they wished to preserve their boilers and heating apparatus from being coated with carbonate of lime, of softening the water by Dr. Clarke's process. This process is known to many as an extremely beautiful and simple one. The hardness of chalk waters depends principally upon their containing a certain abount of bicarbonate of lime in solution. Lime is soluble in water readily, bicarbonate of lime is soluble in water readily, but carbonate of lime is insoluble. If, therefore, the bicarbonate could be converted into a carbonate it would be deposited from the water, which would thus become soft. This conversion of the bicarbonate into a carbonate is effected in Clarke's process by mixing with the natural water containing the bicarbonate a small portion, one-tenth to an eighth, of water in which lime has been dissolved. On these waters being united they instantly become milky, and after being allowed to stand for some hours the water again becomes bright, the carbonate of lime having fallen to the bottom. This operation, however, it will be seen, requires very large depositing tanks, and a considerable expense, therefore, in plant, but Mr. Porter has recently invented an improvement upon Clarke's process which appears to promise excellent results, and has after experiment been adopted at Banstead. The principle and mode of treatment, as far as the chemistry is concerned, are precisely the same as Dr. Clarke's, but instead of waiting the slow process of deposition to separate the carbonate of lime from the water, the mixed water is passed through filter presses of a peculiar construction, wherein the very carbonate of lime itself is made the filtering medium for itself, and in this manner within a quarter of an hour of the mixture having been made, perfectly pure and soft water issued forth. There are four presses at Banstead, and these are sufficient to filter an average hourly quantity of 60,000 gallons of the purest and softest water. This water is pumped into the tank on a tower 80 feet high. The tank contains 240,000 gallons. Six-inch pipes, so as to avoid friction, are laid all over the asylum, and internal and external hydrants are fitted thereto. Moreover, if a fire continued so long that the tank was exhausted, the engines which draw the water from the well and raise it into the tank can be caused to act direct as fire engines. The whole of the work, except the Porter-Clarke process, has been carried out by Messrs. Eastons and Anderson, and the author of the paper was the engineer to whom the Middlesex magistrates confided the design and superintendence of the work.

In the discussion which followed, Mr. J. R. Napier, C.E., of Glasgow, expressed his entire approval of the system of forced circulation, and the hopes it held out for the economic warming of artisans' dwellings; and added that not only would it enable those dwellings to be warmed, but it would also enable them to be efficiently ventilated, because while persons objected to large amounts of ventilation by cold air and would not allow the ventilating aperture to remain open, they readily welcome fresh air when that air was warmed to an agreeable temperature.

Captain Douglas Galton said he believed the system of forced circulation of heated water would get rid of the great difficulty that had been experienced in heating hospitals and other very large buildings, and that the Porter system would bring the Clarke process of softening into an available form for moderate quantities of water, quantities in respect of which Clarke's process had hitherto been found inapplicable in consequence of the space required for the depositing tanks and the expense of their construction.

The President said he could do little more than endorse the opinions expressed by Mr. Napier and Captain Galton on the great importance and value of the method of heating buildings which Mr. Bramwell had invented. The peculiarity of this system consisted in the application of considerable pressure by mechanical means—namely, by a centrifugal pump—to the production of rapid circulation in the pipes; whereas circulation in the ordinary system of heating by hot water, being produced simply by the difference of pressure resulting from the relative specific quantities of a hot and cold water column, was necessarily

of a feeble character. But the means Mr. Bramwell had described enabled them to heat any one or more sections, or, if necessary, the whole of the building, to any required degree of temperature by simply opening or closing the cocks in the branch pipes which connected the direct and the returning water mains. The value of Clarke's process for softening water was now fully established, and from all they had heard its application in the mode invented by Mr. Porter was found to be most effective. Whatever difference of opinion might exist as to the effect of hard chalk water and soft water in the manufacture of the decoction of tea, they must all agree that for many domestic purposes an ample supply of soft water was most essential.

Legal Notes and Queries.

BY-LAWS AS TO BUILDINGS.

PLEASE state your opinion of the legality of the following resolution :—'Resolved, that any plans of purposed erections passed by this board shall remain in force only for the twelve months next following their approval ; and that if the works are not proceeded with in the twelve months, the plans to lapse?' B.

[The Public Health Act does not by any express provision allow a local board to sanction building plans on conditions as to time ; and we are disposed to regard as invalid any such by-law as that suggested.]

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

WATER-SUPPLY DIFFICULTIES.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Perhaps no question is more frequently asked than 'When is London likely to have a better supply of water?' but, like many other questions, it is more easily asked than answered, and judging from the present aspect of affairs the problem of a pure water-supply for the metropolis will have to be consigned to the same limbo as the quadrature of the circle and the search after the philosopher's stone. How does it now stand?

In 1869 the Royal Commission on Rivers' Pollution issued their first report, wherein they merely threw out a suggestion 'that the control of the London water-supply should be changed,' but in their sixth report, issued in 1875, they went far beyond this, and recommended 'that the Thames should, as early as possible, be abandoned as a source of water for domestic use, and that the sanction of Her Majesty's Government be in future withheld from all schemes involving the expenditure of more capital for the supply of Thames water to London.'

In 1876 the Metropolitan Board of Works commenced sitting on the question, and by February 1877 they had hatched the following resolution : 'That in the opinion of this Board the time has now arrived when effect should be given to the report of the Royal Commission on water-supply, so far as the same refers to the supply being placed under the control of a responsible body,' the subject being then referred back to the committee with instructions to 'prepare a Bill.'

Once more, in 1876, a select committee of the House of Commons was appointed 'to inquire into the water-supply' (just as though the subject was a novel one, and had never been inquired into before), and they also arrived at the conclusion that 'the water systems now belonging to the various companies should be consolidated in the hands of a public authority.'

The Session of 1877 has, however, passed away, and left the water-supply of the metropolis in the same unsatisfactory condition as it was ten years ago, when the Rivers' Pollution Commission first commenced their labours, with this trifling addition—that every year as population increases the source of supply becomes more and more contaminated, and the consequent risk of using it is largely augmented.

Now what does this 'changing the control of the water-supply' and 'consolidating the water systems in the hands of a public authority' really amount to after all?

It simply means that the interests of all the metropolitan water companies are to be bought up at a cost of something like twenty-five millions of money, and vested in the hands of the Board of Works, or some similar body.

But would this guarantee a purer supply of water to London? Not in the least. After having spent your twenty-five millions you will be just as far from having a pure supply as ever, for Sir J. Bazalgette and two other eminent engineers say that this enormous amount 'would have to be supplemented by a further, and perhaps an almost equal outlay, to replace the water by other derived from purer sources, *even if indeed if it could be got at all.*'

Thus after an expenditure of forty to fifty millions, and a patient waiting for perhaps ten more years before the new system could be fairly brought into operation, Londoners might find themselves saddled with a greatly-increased water-rate, and yet be no better off in the matter of their water than they were before.

Truly it is better in some cases to 'bear the ills we have, than fly to others that we know not of.'

One thing at any rate is perfectly certain, and that is that London water, as at present supplied by the various companies, may be so purified by domestic filtration as to become equal in wholesomeness to any natural drinking water in the United Kingdom ; and as good domestic filters can now be purchased from a guinea upwards, it becomes a serious question for the householder whether it is not better to incur this outlay at once, and resist to the utmost of his power all these schemes for the expenditure of large sums of the public money on what must be at the best a doubtful and long-deferred benefit.

THE SILICATED CARBON FILTER COMPANY.

Battersea, S.W., August 21, 1877.

HOW TO SAVE COAL.

(*To the Editor of the* SANITARY RECORD.)

SIR,—As the supply of coal is limited, and the consumption increasing, its economy is of prime importance. The waste in domestic fireplaces in the shape of smoke and misdirected heat varies from 50 to 80 per cent. in many cases, while the discomfort of smoky rooms, bad cookery, and draughts, drives many to seek in public houses a costly alternative. It is well known that bottom-fed fires consume, while top-fed fires create smoke. The difficulty has been how to feed domestic fires at the bottom. A slight alteration in the front bars is all that is necessary. If one or two of the lower bars are movable, the hot coal may be lifted up till the fire is replenished below. The bottom of the fire-box could easily be covered with a piece of sheet iron, to prevent slack from falling before it is consumed, and a narrow slit or a damper would provide egress for the thoroughly-consumed ashes. A receptacle at the fire back would utilise much of the heat wasted on bricks, and might be fitted with utensils for warm water, stewing, etc., without a separate fire under the oven. Constant dropping wears away stones, and constant waste in trifles means much in the long run.

HY. FLETCHER.

4 Hanging Ditch, Manchester.

THERE were fifty-seven applicants for the Borough Surveyorship of Chesterfield.

Sanitary Invention.

THE PATENT MINIATURE DUPLEX FUNERAL CAR.

THIS invention meets a want long felt in rural districts of a substitute for bearers in the humbler class of funerals. On sanitary grounds we would strongly recommend the adoption of this convenient and economical car. Many cases of contagious and infectious diseases have arisen among bearers of coffins at what are called walking funerals. The risk of spreading disease is minimised in cases where bearers are dispensed with, besides which the expenses of a funeral are considerably curtailed by using the car under notice.

It can be used open or closed, the change being effected in a few moments by the most inexperienced person. As it is lightly but strongly constructed, it may be readily drawn by one or two men on ordinary roads, and in hilly districts, or on bad ground, by one horse. Plain and neat in appearance, it conduces to the decorum with which funerals should be conducted, and we have little doubt it will be appreciated and its adoption recommended by officers and members of rural sanitary authorities. Messrs. Hatchard, 47 Crawford Street, London, W., who are the manufacturers of this car (and of the large Duplex Car used in cities and towns), recently obtained a certificate of merit for their invention at the Manchester and Salford Exhibition of Sanitary Appliances.

Notice of Meeting.

THE SANITARY INSTITUTE OF GREAT BRITAIN.

THE Sanitary Institute of Great Britain will hold its congress at Leamington, from October 3 to October 6, under the presidency of Dr. B. W. Richardson. An exhibition of sanitary apparatus, appliances, etc., will be opened in connection with the congress. Among the papers to be read, the Ven. Archdeacon Denison will contribute one on the 'Water-Supply of East Brent,' Mr. Joseph Baly on the 'Sanitary Condition of Leamington,' Dr. Edwyn Slade-King on 'Sanitary Works in English Watering-places,' and Mr. James Russell, of Edinburgh, on the 'Necessity of Plumbers and Builders Possessing a Competent Knowledge of the Laws of Health.' Mr. Baldwin Latham, C.E., and Mr. Ernest Turner, F.R.I.B.A., will also read papers.

ERRATA.

IN our account of the Exhibition of Sanitary Appliances at Manchester, we inadvertently omitted to mention that Kidd's Sludge Drying Machine obtained a certificate of merit. Page 125, for 'Wrexham Sewage Farm Company' read 'Wrexham Manure Company,' and for 'worth from 8*l.* to 9*l.* per ton' read 'equal in value to the compound manures usually sold by the country dealer at from 8*l.* to 9*l.* per ton.'

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

BARRY, Mr. Thomas, has been appointed Inspector of Nuisances for the Burton-on-Trent Rural Sanitary District, vice Ward, whose appointment has expired, at 20*o*/. per annum for three years.

DAVIES, Benjamin, M.D. Univ. Edin., F.R.C.S. Eng., has been re-appointed Medical Officer of Health for the Newport Urban Sanitary District, Monmouthshire, for the ensuing year.

DREW, Charles Wallace, L.R.C.P. Edin. and L.M., M.R.C.S. Eng., has been appointed Medical Officer of Health for the Quorndon Sub-District of the Barrow-upon-Soar Rural Sanitary District, vice Wood, resigned: 20*l.* per ann.

HARKER, John, M.D. Heid., L.R.C.P. Edin., M.R.C.S. Eng., L.S.A., Lond., has been re-appointed Medical Officer of Health for the Lancaster Rural Sanitary District for six months.

HOOPER, Alfred, M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the No. 2 Sub-District of the Burton-on-Trent Rural Sanitary District, at 50*l.* per ann. for three years.

PEACOCK, Edwin, M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the Bulkington and Chilvers-Coton Urban Sanitary District, Warwickshire, vice Pitt, resigned.

ROBERTSON, James Davison, M.D. Univ. Edin., L.R.C.S. Edin., has been re-appointed Medical Officer of Health for the Penrith Urban Sanitary District.

SHORTRIDGE, Thomas Wood, L.R.C.P. Edin., L.R.C.S. Edin., has been appointed Medical Officer of Health for the Honiton Urban Sanitary District, Devon, vice Macaulay, whose appointment has expired.

SMITH, Samuel John, M.D. Qu. Univ. Irel., L.R.C.S. Edin. and L.M., has been appointed Medical Officer of Health for the No. 1 Sub-District of the Burton-on-Trent Rural Sanitary District at 50*l.* per ann. for three years.

UNDERHILL, Arthur Stopford, M.D. Univ. Dub., M.R.C.S. Eng., has been re-appointed Medical Officer of Health for the Tipton Urban Sanitary District at 80*l.* for one year.

WALKER, Henry, L.F.P.S. Glas., has been appointed Medical Officer of Health for the Baildon Urban Sanitary District, Yorkshire, vice Murgatroyd, whose appointment has expired.

WOODS, Mr. Charles Fletcher, has been appointed Inspector of Nuisances for the Penrith Urban Sanitary District, vice Todd, resigned.

*** ERRATUM.—In the Appointments given in our last number, p. 148, *for* STEPHEN, I. T., *read* STEPHEN, John T.

VACANCIES.

BOURNEMOUTH IMPROVEMENT COMMISSIONERS AND URBAN SANITARY AUTHORITY. Clerk.

CARMARTHEN RURAL SANITARY DISTRICT. Medical Officer of Health for the No. 1 Sub-District.

PENRIDGE RURAL SANITARY DISTRICT, Staffordshire. Medical Officer of Health. 100*l.* per ann.

SALFORD, CORPORATION OF, AND URBAN SANITARY AUTHORITY. Surveyor and Engineer, 700*l.* per ann. Application, 19th instant, to C. Moorhouse, Town Clerk.

STEYNING RURAL SANITARY DISTRICT, Sussex. Inspector of Nuisances: 120*l.* per ann. for three years. Application, 11th instant, to Edward Cripps, Clerk to the Authority, New Shoreham.

STOCKTON-ON-TEES, CORPORATION AND URBAN SANITARY AUTHORITY OF. Surveyor: 300*l.* per ann. Application, 21st instant to H. G. Faber, Town Clerk.

TONG STREET LOCAL BOARD AND URBAN SANITARY AUTHORITY, Yorkshire. Collector: application, 11th instant, to C. M. Wilson, Clerk, Bradford, Yorkshire, addressed to 'The Chairman of the Local Board.'

WOKINGHAM LOCAL BOARD AND URBAN SANITARY AUTHORITY. Surveyor and Inspector of Nuisances: 150*l.* 10*s.* and 32*l.* 10*s.* per ann. Application, Sept. 5, to Edward Frankum, Clerk.

SANITARY PATENTS.

2524. A new method of purifying water, Frank Wirth, Frankfort-on-the-Maine, Germany. A communication from Edward Bohlig, Eisenach, Germany.

2600. Improvements in stench traps, Matthew Wilson, Leadenhall Street, London.

2618. Improvements in traps for gulleys, sinks, and other places, Richard Newman Somerville, Galway, Ireland.

2690. Improvements in machinery for the manufacture of wire nails and shoe rivets, Henry Evans, Newport, Monmouthshire.

'THE DUPLEX CAR is the lightest, prettiest, best constructed, and best appointed car that has ever been brought under our notice.'—*Church Review.* Inventors, Patentees, and Builders: S. HATCHARD & Co., General Funeral Furnishers, 47 Crawford Street, W. Miniature Duplex Cars (used open or closed, drawn by men or horse) built for the country.—ADVT.

NOTICE.

THE SANITARY RECORD *is published every Friday morning, and may be ordered direct from the Publishers. Annual Subscription, 17s. 4d.; free by post, 19s. 6d.*

Reading Covers to hold 12 *numbers of* THE SANITARY RECORD *have been prepared, and may be had direct from the Publishers or through any Bookseller, price* 3*s.*

Original Paper.

ON THE WATER-SUPPLY OF SEASIDE WATERING-PLACES.

BY G. W. WIGNER, F.C.S.

(*Continued from p.* 152.)

BEFORE passing to the further consideration of the samples which I have obtained, I must make some general remarks as to the information I am giving in these papers. This information naturally divides itself into two distinct classes, viz., first, the general information as to the character of the supply and the sources from which the supply is derived, and second, the results of the analyses and the deductions therefrom. At the commencement of these papers,* I stated that I alone am responsible for the collection of the samples unless otherwise specially mentioned, and that I also am alone responsible for the analyses, but I did not then state equally clearly the mode in which the general information has been obtained. I will do so now. When this inquiry was decided on I wrote a letter which (before samples of water were taken from any watering-place) was addressed and sent by post to the engineer or surveyor of every town on the water-supply of which I proposed to report; in this letter I stated briefly the character of the inquiry about to be undertaken, and asked to be supplied at my expense with a sample of water, and also asked the favour of replies to an enclosed series of lithographed questions, which replies would, I thought, give all necessary information as to the population, the source from which the water was derived, total quantity supplied, whether the supply was constant or intermittent, and whether it was available for fires,—I also enclosed a stamped envelope for reply. Replies to these questions have been pretty generally received, and it is noteworthy that they have most frequently come to hand from those towns where the character of the supply is good. On the other hand some replies have been peculiar. Thus in one case the reply was that they could not see what business the SANITARY RECORD or Mr. Wigner had to interfere in matters which only concerned the townspeople—the visitors being apparently considered as of no importance (though they nearly double the population of the place); in another town the surveyor, while kindly giving me the information, said he would forward me a sample of the water if I would send him my analysis with the remarks thereon for his correction before it was published. I need hardly say I declined the latter offer. In a third case I received no reply at all to my questions, but on applying at the waterworks for a sample the man in charge stated that he had received orders not to allow anyone to have a sample of the water, which was consequently obtained elsewhere from a main tap. Our readers will not be surprised to learn that two of these waters have turned out bad.

In such cases as these and in other cases where no notice was taken of my letter, the necessary information has been as far as possible procured on the spot from what appeared to be the most trustworthy sources; in most towns an official of the water company or of the local authority, or in some cases an active member of the local board has been found willing to give information which, in these cases, *may* be less reliable than if obtained from the town surveyor or engineer, and I have, therefore, in my papers generally prefaced it by some such remark as 'it is said.' Considering the care I have taken to go to the most reliable sources for information, I think the errors even in cases where the surveyor or engineer refused or neglected to reply to me will be found to be few and far between.

I am led to make these remarks now because Mr. Valentine, the engineer of the Hunstanton Water Company, writes to traverse certain statements as to the supply of that town. My analysis of the Hunstanton water was published in No. 165, on August 24 last; the series of questions to which I have alluded were addressed and posted to the surveyor or engineer at Hunstanton on July 17, and I have been informed that on July 20 they were forwarded by post to Mr. Valentine at the private address from which the latter now writes. Mr. Valentine, however, has not replied or taken any notice of the communication until, on September 7, he writes to complain of the published statements. In my paper I state 'the water *is said* to be pumped from a chalk well.' Mr. Valentine now says it is pumped from springs which burst out from the lower greensand. I also state '*it is reported* that an analysis of it has recently been made at Edinburgh;' the engineer now says the analysis was made by Dr. Voelcker, and that he does not know of any other. So much for general information. I publish the corrections with pleasure. My original informant was a respectable official at Hunstanton, but I decline to publish his name, for fear he should incur the ban of his superiors, and be discharged, as I understand was the case with an official who previously gave me information with reference to the supply of another town.

The engineer further challenges my statement when I say 'the colour of the water was a dirty opaque yellow, due to heavy traces of suspended matter, showing the necessity for filtration.' He states in reply that Dr. Voelcker describes his sample as 'bright, colourless, and free from smell.' I am glad to hear this, as it shows that the water was at one time better than it is now, and it ought to be easy for an engineer to find out the cause of the deterioration. The colour of the sample my assistant obtained on July 28 was very bad, and my description of it is accurate. If Mr. Valentine will personally draw another sample from a main tap and send it to me, I shall be happy to see if the water has improved since my previous examination, and I will publish the results without cost to him.

SANDWICH is a small town of only a few thousand inhabitants, and has few visitors, except those from the neighbouring watering-places. It has no public water-supply except from pumps, most of which derive their water from what is known as the Delf Stream, which runs through the town. The inhabitants complain of the water from this stream becoming turbid at times, I obtained two samples, one from a pump drawing direct from this stream, and the other from a pump called the market-pump. The results are as follows:

	Market Pump. Grains per gallon.	Delf Stream. Grains per gallon.
Total solid matter	103·80	21·60
Loss on ignition after deducting combined carbonic acid . . .	11·30	4·42

* See SANITARY RECORD, No. 165, p. 117.

	Market Pump. Grains per gallon.	Delf Stream. Grains per gallon.
Lead and copper—none.		
Iron—traces.		
Chlorine calculated as chloride of sodium	29·07	3·51
Hardness before boiling, Market Pump, 36·5°; Delf Stream, 12·1° (Clark's scale)		
Hardness after boiling, Market Pump, 19·0°; Delf Stream, 3·5° (Clark's scale)		
Nitrogen as ammonia	0·0029	0·0080
,, albuminoid ammonia	0·0270	0·0061
,, nitrates	4·1300	0·2070
,, nitrites	0·0040	0·0030
Total nitrogen in these four forms	4·1639	0·2241
Oxygen absorbed by organic matter	0·0540	0·0420

The colour of both samples was very objectionable—a dirty opaque yellow; the market-pump was fairly free from unpleasant smell or taste, but the results of the microscopical examination were eminently unsatisfactory. The residue left on evaporating a few drops on a glass slide was full of animal matter, a good deal evidently being decomposing animal remains and muscular fibre. The chemical results combined with these show that it would be much more appropriate to call the liquid from this pump sewage rather than water. If the authorities do their duty they will close the pump immediately.

The Delf Stream water, when warmed, had an objectionable taste and smell, with something of an astringent character. There is said to be a tan-yard on its banks, near to the town, and the taste certainly accords with this statement, for it seems to have an astringent character, while the smell resembles that of water in which leaves have been decaying. The tan-yard *may* be responsible for these results. The microscopical examination was also very unsatisfactory; the water was full of living organisms, some monads only, but a large number of higher grades. Despite the chemical results, it is a very unsatisfactory water and, swarming as it does with animalculæ, must be condemned. Sandwich certainly stands in sore need of a supply of water instead of sewage.

DEAL has a population of about 8,000; it is supplied with water from wells in the chalk, the water being pumped into a reservoir, from whence it gravitates to the town. In the lower part of the town the supply is constant; in the other part for about four hours per day. The average quantity supplied is said to be only about twelve gallons per head per day, which is obviously quite insufficient.

The waterworks are situate about two miles from the sea, and are owned by a company who also supply the neighbouring parish of Walmer, which has a population of about 4,000. I have analysed three different samples of the water-supply; the first one was received from the surveyor, and gave the following results:

	Grains per gallon.
Total solid matter	25·40
Loss on ignition after deducting combined carbonic acid	4·70
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	3·51
Hardness before boiling, 15·1° (Clark's scale)	
,, after boiling, 3·5° ,, ,,	
Nitrogen as ammonia	0·0015
,, albuminoid ammonia	0·0029
,, nitrates	0·5350
,, nitrites	0·0080
Total nitrogen in these four forms	0·5474
Oxygen absorbed by organic matter	0·0144

The colour of this water was yellowish from the presence of traces of suspended matter; the sample was free from objectionable smell, the taste was slightly chalky, but in no other way objectionable. The results of the microscopical examination were satisfactory.

I took two other samples—one from a main tap at an hotel near the station, and the other from the reservoir itself. The following are the results of these two samples:

	Deal Town. Grains per gallon.	Deal Reservoir. Grains per gallon.
Total solid matter	26·60	27·40
Loss on ignition after deducting combined carbonic acid	1·18	2·87
Lead and copper—none.		
Iron—none.		
Chlorine calculated as chloride of sodium	3·35	3·51
Hardness before boiling, Deal Town, 14·7°; Deal Reservoir, 15·0° (Clark's scale)		
Hardness after boiling, Deal Town, 4·2°; Deal Reservoir, 4·0° (Clark's scale)		
Nitrogen as ammonia	0·0037	0·0049
,, albuminoid ammonia	0·0026	0·0023
,, nitrates	0·3740	0·3460
,, nitrites	0·0040	0·0040
Total nitrogen in these four forms	0·3843	0·3572
Oxygen absorbed by organic matter	0·0080	0·0200

The sample from the reservoir contained traces of suspended matter; both samples had a slight smell, and, when warmed a taste of chalk, but they were free from the yellowish colour which was found in the sample received from the surveyor, which was apparently caused by suspended ferruginous matters. The microscopical examination was satisfactory.

These three samples are very accordant in composition, and are all good. The water is less hard than either Westgate or Ramsgate, and contains less nitrates and chlorides, while the albuminoid ammonia is only a trifle higher than at those places.

DOVER has a population of about 30,000, but the number of visitors is small as compared with some of the watering-places to which I have already alluded; the town is said to be supplied from a well in the chalk on Castle Hill, and there is a constant supply. A sample drawn from the mains gave the following results:

	Grains per gallon.
Total solid matter	22·90
Loss on ignition after deducting combined carbonic acid	3·08
Lead and copper—none.	
Iron—none.	
Chlorine calculated as chloride of sodium	2·81
Hardness before boiling, 15·0° (Clark's scale)	
,, after boiling, 3·0° ,, ,,	
Nitrogen as ammonia	0·0018
,, albuminoid ammonia	0·0024
,, nitrates	0·1390
,, nitrites	0·0010
Total nitrogen in these four forms	0·1442
Oxygen absorbed by organic matter	0·0110

The results of the microscopical examination were quite satisfactory. The water was free from objectionable smell or taste, and was of a good pale blue colour, and free from suspended matter; and taking all the points of the analysis into consideration, it is the best and purest water I have yet referred to. It is softer than Ramsgate or Westgate, and in this respect practically identical with Deal, but it contains less salt and considerably less combined nitrogen than the Deal water.

FOLKESTONE has a population of about 13,000. The water-supply is said to be derived from a number of wells, belonging to a company at the Cherry Tree Waterworks. The wells are reported to be shallow, and it is said that the water is pumped from them into a reservoir and supplied to the town by an intermittent supply. The results which I obtained from a sample drawn from a main tap are as follows:

	Grains per gallon.
Total solid matter	24·40
Loss on ignition after deducting combined carbonic acid	5·34
Lead and copper—none.	
Iron—none.	
Chlorine calculated as chloride of sodium	4·21
Hardness before boiling, 13·4° (Clark's scale)	
,, after boiling, 4·0° ,, ,,	
Nitrogen as ammonia	0·0023
,, albuminoid ammonia	0·0050
,, nitrates	0·0390
,, nitrites	0·0030
Total nitrogen in these four forms	0·0493
Oxygen absorbed by organic matter	0·0176

The water contained traces of suspended matter, which rendered it slightly turbid, otherwise the colour seemed good. The smell even when heated was good, but a slightly chalky taste was perceptible. The microscopical results were quite satisfactory. The water would be improved by filtration. As regards the chemical results it is similar to Dover, showing more albuminoid ammonia, but a decrease in the total of the combined nitrogen. It is a good water.

SANDGATE, the next place to which we come, has a population of barely 2,000; it is very doubtful if the visitors during the season would number as many as that. The supply is partly derived from the Cherry Tree Waterworks referred to above in connection with Folkestone, but there appears to be also another supply, though I have been unable to obtain any information as to the source from which it is derived. The analysis of a sample drawn from a main tap at one of the inns was as follows:

	Grains per gallon.
Total solid matter	34·60
Loss on ignition after deducting combined carbonic acid	4·37
Lead and copper—none.	
Iron—none.	
Chlorine calculated as chloride of sodium	6·20
Hardness before boiling, 17·8° (Clark's scale)	
,, after boiling, 4·5° ,, ,,	
Nitrogen as ammonia	0·0022
,, albuminoid ammonia	0·0023
,, nitrates	0·1090
,, nitrites	0·0030
Total nitrogen in these four forms	0·1165
Oxygen absorbed by organic matter	0·0112

The sample was of a pale blue colour and fair smell, and although the solid matter present is considerably higher than in the water from the Cherry Tree Waterworks, the albuminoid ammonia is lower. The microscopical results were very satisfactory. . . .

Comparing the figures with those of the Folkestone supply, we have an undesirable increase of 10 grains in the total solids, combined with a very satisfactory decrease in the albuminoid ammonia, the salt, however, being a little higher. It is a very good water-supply.

HASTINGS AND ST. LEONARDS have a joint population, according to the last census returns, of about 30,000, but this number is of course very greatly increased during the visiting season, which lasts during a large portion of the year. The water-supply is derived, according to the report of the surveyor, from wells, springs, and rainfall, and amounts to an average of about 20 gallons per head per day. The supply is intermittent, lasting for some seven hours only per day. The greater part of the water is filtered, and it is reported that the authorities are making arrangements to filter the remainder.

Hastings proper is supplied mainly from the Buckhole Waterworks and St. Leonards principally from Hollington well. I have two samples from each place. From Hastings one was drawn by my assistant on July 28 last from a main, and another was received from the surveyor on August 2, and the following are the results:

	From Main, July 28. Grains per gallon.	From Surveyor, Aug. 2. Grains per gallon.
Total solid matter	16·30	25·70
Loss on ignition after deducting combined carbonic acid	2·93	7·70
Lead and copper—	none	none
Iron	traces	none
Chlorine calculated as chloride of sodium	6·85	8·42
Hardness before boiling, from Main, July 28, 5·2°; from Surveyor, Aug. 2, 8·7° (Clark's scale)		
Hardness after boiling, from Main, July 28, 3·0°; from Surveyor, Aug. 2, 6·2° (Clark's scale)		
Nitrogen as ammonia	0·0025	0·0021
,, albuminoid ammonia	0·0056	0·0032
,, nitrates	0·0560	0·2490
,, nitrites	0·0050	0·0030
Total nitrogen in these four forms	0·0691	0·2573
Oxygen absorbed by organic matter	0·0580	0·0700

Both samples contained traces of suspended matter, apparently of clay, which gave a slight yellowish tint to the water; they were both free from objectionable taste or smell, and the microscopical appearance was in each case satisfactory. It will be seen, however, that they differ seriously one from the other—the difference in the total solid matter being nearly 9 grains, and the difference in hardness as much as 3 degrees Clark's scale; this variation with such a short interval between the taking of the two samples is, to say the least, extremely unsatisfactory.

St. Leonard's proper has a partly independent supply. One of my samples was drawn on July 28 last, from a main, and the other (marked Hollington Well), was received on August 13, from the surveyor. The results are as follows:

	From Main, July 28. Grains per gallon.	Hollington Well, Aug. 13. Grains per gallon.
Total solid matter	18·10	15·20
Loss on ignition after deducting combined carbonic acid	3·79	6·29
Lead and copper—none.		
Iron—traces.		
Chlorine calculated as chloride of sodium	4·47	4·45
Hardness before boiling, from Main, July 28, 5·0°; Hollington Well, Aug. 13, 4·5° (Clark's scale)		
Hardness after boiling, from Main, July 28, 3·4°; Hollington Well, Aug. 13, 3·8° (Clark's scale)		
Nitrogen as ammonia	0·0026	0·0047
,, albuminoid ammonia	0·0032	0·0037
,, nitrates	0·0380	0·0660
,, nitrites	0·0040	0·0040
Total nitrogen in these four forms	0·0478	0·0784
Oxygen absorbed by organic matter	0·0250	0·0340

These results are again very discordant, although it will be noticed that a fortnight elapsed between the dates when the two samples were taken. In both cases I still found the dirty yellow colour referred to previously in reference to the Hastings water, which colour was due to a similar cause, viz., heavy traces of suspended matter, proving still further that it is necessary to complete as quickly as possible the improved filtering arrangements. Both of these St. Leonard's samples were free from objectionable taste or smell, and the microscopical examination did not reveal any features of an objectionable character, but the irregularity would seem to point to the necessity of greater storage-room, even if no greater harm is likely to arise. Storing water in reservoirs properly constructed and properly taken care of always does good, by ensuring oxidation of the organic matters. No water-supply is so deceptive or dangerous as a variable one.

In my next paper I shall refer to the water supplies of EASTBOURNE, BRIGHTON, SHOREHAM, WORTHING, LITTLEHAMPTON, BOGNOR, and one or two smaller places which have been missed from their proper geographical order, and either in this or the following paper I shall make a summary of the results so far as at present obtained.

LOWESTOFT WATER-SUPPLY.

WE have received a letter from the proprietor of the Royal Hotel at Lowestoft, asking us to state that that hotel is supplied with water from the public waterworks, and not from wells. On reference to Mr. Wigner, we find that the sample of pump-water drawn from an hotel at Lowestoft, and referred to in No. 165, p. 199, was not obtained from the Royal Hotel.

THE *Transactions* of the Medical Society of Upsala contain an account of an ingenious piece of rascality in the hop trade said to be practised in that city on a considerable scale. Hops which have already been used for making extracts, or for brewing in the ordinary way, are damped with tincture of absinthe, or wormwood, freed from spirit by distillation, redried, and then placed upon the market as a genuine article, with or without the addition of a little fresh bloom. Owing to their increased bitterness they often command a better price than unadulterated hop.

THE
SANITARY RECORD.
FRIDAY, SEPTEMBER 14, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

THE POWERS OF WATER COMPANIES.

JUDGING by the complaints which we ourselves have received, and by the letters which have appeared in the newspapers, the dissatisfaction felt against the arbitrary tyranny of the water companies is great and growing. We are not alluding to any one company in particular, but to London and provincial water companies generally. Viewed as a matter of policy it is exceedingly unwise of the companies to invite as they really are doing hostile criticisms, for the opinion is spreading that the water-supply of towns ought to be in every case in the hands of the local authority, and in many instances companies are contributing to the development of this idea by their exactions, probably, however, without the least intention or desire to promote a taste for the compulsory purchase of water-works.

It is the treatment of the metropolis by the London companies which is now more particularly being brought before the public, but though we in London may not perhaps hear much of the sayings and doings of provincial water companies, yet they are, as a rule, treating their constituents quite as badly as the London companies treat us.

Before offering any observations on the present state of the law, it may be well to point out that sanitary authorities, and, *à fortiori*, private individuals are often somewhat hindered in discovering their rights and privileges as against water companies, by reason of the fact that nearly all of these companies possess powers under Private Acts, which Acts are on that account not generally within the reach of those most intimately affected; and though it is true that most of these companies derive a portion of their powers from the various Water Works Clauses Acts, yet as these Clauses Acts only have a limited and somewhat indirect bearing on the general functions of sanitary authorities, such authorities are not often called upon to study water law.

The present controversy between the public and the companies, though it embraces various points, is at this moment, so far as the metropolis is concerned, chiefly centred in section 70 of the Waterworks Clauses Act, 1847. The operative part of this section, so far as regards England and the

present dispute, runs as follows :—'The rate shall be paid in advance by equal quarterly payments at Christmas Day, etc., etc.' Whether Parliament did wisely in conferring such a power as this on the water companies is a point which may well be questioned, but that which is especially to be noted is the ingeniously oppressive way in which the companies carry out this section. That the matter may be clearly understood, we transcribe the following passage from the complaint of one whose experience is derived from contact with the Chelsea company. In a letter to the *Builder* 'G. Mitchell' says :—

'The water was cut off on May 9 for rates not due till June 24. But not to make any mystery of the matter, permit me to point out what is the exact mode of operation on the part of water companies. First, they make a rate in advance. Then they worry people until they have paid it, and the result is that three parts of the water in London are paid for before being used. I, however, have a great objection to payment in advance. I never pay in advance if I can help it. I therefore wait until the end of the period before they get my cheque. Of course I get very much bothered, and at last I get insulted. I get threatened that if I do not pay I shall have a man sent into my house to commit an act of violence and destruction. Then I pay. But if I did not, or could not do so, what would be the consequence? Why, they would saddle me with two quarters' more rates as a punishment for not having paid in time. So that a poor man who has to allow the water to be cut off is bound to pay so much in advance on account of his poverty.'

The answer to this on the part of the companies is that without pre-payment they would often get defrauded, but such a complaint is one which every tradesman might make, and, if acted upon, would stop half the trade of the country. It seems to us that water companies ought not to be put upon any more favoured footing than other traders, so that the money payable to them should not become legally due until the water had been actually supplied, for a water company, especially in London, cutting off the water-supply of a house, is not in the position of a Bond Street tradesman supplying a spendthrift with cravats or jewellery, the stoppage of which affects nobody but himself, and has nothing to do with his health. The act of cutting off water is one which instantly affects the health, cleanliness, and food of, it may be twenty different people, and disease may break out even in the few days which must usually elapse before the defaulting tenant and the tyrannical water manager can come to terms. The case of cutting off gas for non-payment of a gas bill is no precedent for doing the same in the instance of water. A gas defaulter, even if his default is both wilful and fraudulent, does not by his wilfulness and fraud endanger the health of his family or lodgers, because both he and they can at five minutes' notice find a substitute for gas in lamps or candles. For water, however, there is no substitute, and therefore we are quite prepared to go so far as to say that under no circumstance whatever should a water company be empowered to cut off the water-supply of a house merely for non-payment of a current rate. If the cutting-off power is to be retained at all it should, in our opinion, be restricted to cases of long arrears (six months at the least) and a month's notice not only to the defaulter, but also to the sanitary authority, should in all cases be obligatory.

We invite correspondence on this subject from our readers, because it is certain that no great length of time will now elapse before the Local Government Board must call the serious attention of Parliament to the whole question of the water-supply of England, and no general discussion of this matter, much less legislation on it, can take place without involving the question of the future relations between water companies and local authorities. The more fully these relations are reviewed, the more clear will it become that it is the duty of Parliament to deprive the companies of many of their present powers and privileges.

THE TREATMENT OF PAUPER LUNATICS.

WHILE freely admitting that the treatment of lunatics in general, and pauper lunatics in particular, has vastly improved since the cruel and scandalous old Bedlam days, every day teaches us that there is yet infinite room for further improvement left. Our medical contemporaries have repeatedly pointed out the significant fact that lunatics' bones are so proverbially brittle that the shadow of a keeper's hand or knee falling on them is counted sufficient to break an arm, or leg, or ribs. Could the real truth only be got at, the condition of many a poor imbecile's body after death would shame us into a better state of things. It is certain that violence is frequently practised, and violence of a kind that may be called skilled. The violence used by keepers is of a kind that tells no tales. Policemen know this kind of punishment well.

It is not our intention just now to suggest the remedies for brutal keepers, but to call the attention of the Commissioners of Lunacy to a recent case, brutal in the extreme, but of a class, unfortunately, too common in many so-called asylums.

On Wednesday, July 8, the Board of Guardians for Brackley met to investigate a complaint in reference to the carrying out of a funeral of a pauper lunatic named Foxley. With the funeral irregularities we have nothing to do. The absence of a pall could not hurt poor Foxley when dead, neither could the delay in procuring a hearse, nor the fact that his sister could not see him for five hours after she applied to do so. That his eyes were not closed

and that his jaw was not tied up, are little matters, save as indicating general negligence and carelessness.

Here are the facts we commend to the notice of the Commissioners. The man had been in 'the asylum' some seventeen weeks. He was a man of particularly clean habits. When his sister went to see him on June 11, she found him 'much bruised about the body, suffering from a large bed sore; his eye was very black, with a cut on the brow.' All this is very horrid; but the sister also added that 'as he seemed to be restless,' she 'looked at his head, and it was one mass of vermin.' As a matter of course the 'nurse could not account for his bruises;' she did account for the bed sores by saying that 'she ought to have put some water bags under him, but had not done so.' The nurse-like simplicity of this is charming.

At this same meeting the relieving officer reported 'that James Wall, labourer, was dead, and that a similar complaint was made with respect to his treatment since his removal from the workhouse to the asylum.'

'The chairman undertook, at the request of the committee, to attend the next meeting of the asylum committee, and bring the matter to their notice.' We think this matter, or rather these matters, demand most searching investigation. No asylum in which such things are possible can be properly conducted, and the whole of the staff are implicated in such charges as these. Indeed, we do not see much, if any, difference between the Penge case and these cases, save that in these there can be no excuse of any kind urged or defence made. Naturally one asks whether both these poor men were not hastened to death by their treatment. As we have before said, we fear this state of things is too common in our asylums; the only thing is that, being hushed up, we do not hear of them. When they do come, even in an out-of-the-way corner, to light, it is our bounden duty to leave no stone unturned until the truth—the whole truth, and nothing less than the truth—has been ferreted out.

The difficulties in the way of managing lunatics and the trials to temper we know full well, but no possible allowance can be made for dirt, neglect, and cruelty. It may be, as Wordsworth puts it, that lunatics' 'lives are hid with Christ in God;' but before reaching their final home they have often to bear the martyr's sufferings and torments.

SMALL-POX AND VACCINATION IN THE METROPOLIS.

Now that the epidemic of small-pox is rapidly passing away it is advisable that we examine some of the data bearing on the protective power of vaccination as at present practised. The districts of Poplar and Hackney have suffered very severely, whilst that of Whitechapel has enjoyed comparative immunity although more densely populated with the poorer classes than either of the others. The medical officer of health for Hackney, Dr. Tripe, states in his report for 1876, that he obtained permission for the examination of the children attending some of the board and parochial schools, and that out of about 800 children examined, although all were said to have been vaccinated, yet 'nearly 25 per cent. were found not to be protected by a sufficient number of satisfactory vaccination marks against an attack of small-pox.' A house to house visitation was made by direction of the Board of Guardians, when a comparatively small number of children were admitted by those having charge of them, to be unvaccinated, and the same occurred at Kensington, although some of the children said to have been vaccinated were subsequently attacked by small-pox, when an examination of the arms showed, that if vaccinated, the operation had not been successful. The vaccination officers have no authority to examine the children contrary to the wish of the parents, so that the visitation in both these districts was attended with but little practical results.

As regards Whitechapel, Mr. Liddle attributes the comparatively small death-rate from the disease in his district, viz., 1 in 2015 population against 1 in 1727 for all London, to the manner in which vaccination is carried out by the public vaccinator, as 52·2 per cent. of the total number of children born were successfully vaccinated by him; but if that be the average, what about the remaining 48 per cent.? Suppose that 10 per cent. died before vaccination, and 5 per cent. moved away and were unfit, the balance should have been done by the practitioners of the neighbourhood; but the statistics of the late medical officer of the Privy Council show that in 1873 Whitechapel was by no means one of the highest as regards the percentage of successful vaccination, Hackney being the worst, Poplar one amongst the best, and Kensington being intermediate between Poplar and Whitechapel. How, then, are we to account for the severity of the outbreak in Poplar and its comparative mildness in Whitechapel, except it be in the quality of the vaccination? We believe that this is the true explanation of the difference, as the examinations of the children in Hackney showed the inefficiency of the operation to protect against an attack of small-pox rather than a total absence of marks. Mr. Liddle considers that much of the inefficient vaccination is due to the impossibility of private practitioners being able to perform it from arm to arm, and that the certificates should state something more than that the operation was successful; whilst Dr. Tripe suggests that the fee should not be paid by the guardians in the first instance, unless there were three good marks, and that, at any rate during an epidemic, all those who have not these marks should be revaccinated at the public expense, even if under twelve years of age, provided that the parents cannot afford to pay for the operation. He also points out that vaccination is not so simple an affair as is generally supposed, and that, unless some febrile excitement take place, the proper protective power of the lymph will most probably not be afforded. The unsuccessful inoculation with small-pox virus by Dr. Jenner of children who had been vaccinated by him shows that proper vaccination is for a time an efficient protection against the disease, so that proper vaccination in infancy and revaccinaction at about fifteen years of age ought to prevent epidemics of small-pox from occurring in future.

Notes of the Week.

THE Evesham Corporation have purchased the gas-works for 9,000*l.*

THE death-rate in London declined to 17·4 last week. In Edinburgh it was 15; Glasgow, 19; Dublin, 27. There were in the metropolis only eight fatal cases of small-pox, the smallest number recorded for the last twelve months.

THE fourteen inspectors of mines, to which position Mr. R. B. Bain has just been appointed by the Home Secretary, are paid at the rate of from 600*l.* to 800*l.* per annum, with the exception of the head inspector, Mr. J. Dickinson, who gets 1,000*l.*

AT the last meeting of the sanitary board of Glasgow, Bailie Wilson reported the success of the public baths throughout the city. He expressed his belief that in two years' time the baths would be self-supporting, so that the Glasgow citizens would be freed from the bath tax.

AT Aberdeen a person was observed to deposit a letter in a disused street hydrant, and, on the cover of the box being removed, three other letters were found, the senders of which had similarly mistaken the water pillar for a pillar letter-box. The letters had been passed into the box through the space formerly occupied by the tap-lever.

AT a general meeting of the Société Française d'Hygiène, held at Paris on the 19th ult., James Christie, A.M., M.D., etc., Glasgow, author of the 'History of Cholera Epidemics in East Africa,' and editor of the *Sanitary Journal for Scotland*, was unanimously elected a Foreign Member of the Society.

AT the last meeting of the Wandsworth and Clapham Union, the medical officer said there was only one applicant for the vacancy of female night nurse. She, however, could not write, and was therefore not eligible. Canon Clarke, the chairman, said there was a great scarcity of skilled nurses.

THE Liverpool borough engineer has reported that the street improvements determined upon by the corporation will involve a net cost of 1,073,845*l.* The acquisition of land is set down at 1,196,278*l.*, and the cost of works, 137,862*l.*; but a sum of 260,295*l.* is deducted as the estimated value of surplus land.

AT the last meeting of the Sittingbourne local board, the surveyor reported that at the present time there were 14,047 houses in the parish, of which 703 are supplied with water from the board's works, now established seven years, as also were two chapels, three schools, one brewery, one malt-house, and the railway station, besides thirty-two houses outside the parish.

A NUMBER of workmen are engaged in laying iron mains in the cloisters and near the north side of St. George's Chapel, Windsor Castle, in order to provide a sufficient supply of water in case of fire. The upper part of the Castle has an excellent water-supply, which on more than one occasion has proved of great service in assisting to extinguish fires in Windsor, near the palace boundaries.

MR. HOLLAND held an inquiry at Sedgley last week touching the pressing necessity of closing the burial-ground, which was alleged to be shockingly overcrowded with corpses. To enable new interments to be made, it was stated, the coffins had been broken up and the bodies cut in pieces. The Commissioner will report to the Home Secretary without delay.

DR. HARRISON has been unanimously elected public vaccinator for the Home Lincoln District in succession to the late Mr. E. F. Broadbent.

AN outbreak of fever has occurred at Hoyland, a colliery village near Barnsley. Already nearly twenty deaths have taken place. The schools have been closed to prevent the disease. The outbreak is ascribed to defective drainage.

THE following have been elected as the new Kirkleatham Local Board and Urban Sanitary Authority, Yorkshire, namely, Messrs. Thomas Dawson Ridley, James Rutherford, John Hikely, Arthur Henry Turner Newcomen, Peter Wallis, John Proud, Edward Robson, Thomas James, and William Nelson.

THE first of a number of people's public-houses, which it is proposed to start in Hull on a similar principle to those at Liverpool, was opened last week by Mr. Charles H. Wilson, M.P. Several leading local gentlemen attended, and the proceedings were very successful. These houses are undertaken by a company with a capital of 10,000*l.*, of which nearly the whole has been taken up.

'SIPHONS.'

THERE are two reasons why the 'siphons' of seltzer and soda-water occasionally explode. The one is the sudden expansion of contained gas on bringing the siphon from a cold cellar into a warm room. The other is the irregular contraction of the glass sometimes caused by plunging it when partially full into a vessel of cold water to cool its contents. Intelligent persons may, when thus forewarned, avoid both dangers.

TIPPLING.

PROFESSOR MUSSEY, of Cincinnati, cites the case of a tippler, who was placed in the almshouse and denied all alcoholic drinks, which he tried to secure by many devices, but in vain. One day he deliberately placed one hand on a block, and with an axe struck it off with a single blow, and with the bleeding, mutilated arm uplifted, he ran to the house crying for rum because his hand was off; it was brought, and he first plunged the bleeding member into the bowl, then drinking from it freely, exclaimed, 'Now I am satisfied.'

WASTE OF FOOD.

THE monthly returns of the amount of fish destroyed at Billingsgate Market by the officers of the Fishmongers' Company is suggestive of waste of food which it ought to be possible to prevent by improved railway and market arrangements. Last month no less than 58½ tons of fish were destroyed by these officials. It might not be beyond the resources or beneath the attention of that august company which contains so many high political and social personages to suggest or to concert measures by which to prevent the waste of valuable food-stuffs of which they are the official agents.

A MODEL SANITARY INSPECTOR.

THE *Western Morning News* says: 'We ought not to allows the record of the death of Mr. Rowley, late sanitary inspector of Plymouth, to pass unnoticed. The tall, though stooping form of Mr. Rowley must be familiar to most Plymouthians, and he was assuredly a faithful servant of the town. His main characteristic, officially, was zeal. Of a nervous and excitable temperament, he would sometimes need the curb, but scarcely ever the spur, and he was one of the few officials who loved his work for its own sake. At the times of cholera visitation and of small-pox epidemic, Mr. Rowley was not only unceasingly active but undaunted by danger. Many a small-pox sufferer did he carry in his own arms to the vehicle which took the patient to the hospital. When the cattle-plague appeared in the borough, Rowley was constantly on the alert, and his vigi-

lance did much to prevent its extension. He well earned the superannuation which the council bestowed after he had passed seventy years of age, and his successors must be smart men if they surpass him in keenness to detect nuisances or in anxiety to repress them.'

THE ROMFORD LIGHTING SCHEME.

AT the last meeting of the Romford local board the tender of Mr. Dietz was accepted for altering the public gas lamps according to his patent for burning oil, and the tender of Mr. E. Pertwee, a local oilman, was accepted for the supply of white petroleum (120 degrees) at 1*s.* 2*d.* per gallon, for lighting the lamps. There were six tenders, including those of the American Oil Light Company, the Crown Lubricating Company, and several other London firms. Applications from twenty town councils and local boards in different parts of the country have been made to the Romford authorities for information as to the cost and *modus operandi* of substituting petroleum for gas in the public streets.

POISONED TREACLE.

AT the last meeting of the Lewisham Board of Works the analyst reported that a large quantity of treacle, which had become accidentally poisoned with arsenic, had found its way into the market and was being extensively sold. Two families had, it was stated, been already poisoned by the mixture, and the analyst advised that samples should be taken from every cellar in the district. The clerk, in answer to a question, said this would necessitate the purchase of 100 samples. The Rev. Taylor Jones said the poisoned treacle would probably be found in the poor districts, where it could easily be disposed of at low prices. He moved that two samples should be at once taken from each parish in the district, and that if either of these were found to contain poison, steps should be taken for the immediate analysis of further samples, and for preventing the sale of so dangerous an article. The board resolved to adopt this course.

DIP-TRAPS TO HOUSES.

THE *Builder's Weekly Reporter*, of August 10 last, contains the following rule for building a dip-trap between the house and the sewer—a kind of trap mostly relied upon by builders to prevent the inroad of rats or of sewer gas. Let the well, it states, be made 18 in. or 2 ft. in diameter, square or round, and 2 ft. 6 in. or 3 ft. deep, across and below the level of drain, it must be built around with brick in cement, and be plastered on the inside with the same material, which will make it capable of retaining fluid. Uprightly across the well, and in the transverse direction of the drain, must be placed a sound piece of paving stone, so long that its ends may be inserted in the sides of the wall, and so wide that its upper edge shall touch the covering of the drain, and that its lower may reach 6 in. or 9 in. down into the well below the bottom of the drain. Mortar or cement must prevent the passage of air between the upper edge of this trap stone and the cover of the well and drain, and the trap is complete. The water coming from the sink flows along the drain where it falls into the well, and, filling it up, flows on again to the cesspool or common sewer, from which, however, no smell can return, for the trap stone, the lower half of which is then immersed in water, completely bars the passage.

We have no hesitation in saying that these traps are, as a rule, the foulest things possible about a house. If too large, they degenerate into mere cesspools, and they frequently cannot be ventilated in any way. Unfortunately, however, they are almost the only thing that can be used in some situations, as, for instance, in occupied area vaults where an open disconnection is inexpedient. But we should feel more inclined to trust to a common flap trap in the drain or sewer than to some of the dip-traps we have seen. If used at all, they should be built as narrow as possible, and every angle should be well rounded. The majority of the siphons which were meant to take the place of these dip-traps are unfitted in many cases for the work owing to badness of shape, but mostly to a lack of sufficient fall previous to just entering the siphon. We should recommend a siphon first, a flap-trap second, and the dip-trap last of all.

THE TELEPHONE IN MINES.

A NEW application of the telephone has just been tested in Cornwall by Dr. C. Le Neve Foster, her Majesty's inspector of mines for the district. A ready means of communication between the surface and the workings of the mines has long been required, the present cord signals being obviously imperfect and the ordinary telegraph instruments being inapplicable for unskilled use, as well as costly. Dr. Foster and his brother, Mr. A. Le Neve Foster, who is a telegraph engineer, have tried the telephone at the Eliza Mine, St. Austell, and found it, as might be expected, to answer perfectly. The instrument used was Bell's Articulating Telephone, the same which attracted so much attention at the British Association meeting at Plymouth. Its simplicity and the very low cost with which it can be applied were thought to render it specially applicable for such a rough-and-ready purpose as this, for it requires no more skill to use, or care to keep in order, than a speaking-tube.

SANITATION IN BULGARIA.

ONE of the *Times* correspondents writes: The first building in the yard is the dwelling-house; the gable end faces the south, and is entirely open, the sides being about 4 ft. and the apex of the roof 7 ft. above the surface of the earth, the width being about 12 ft.; one-half of this width forms a bench of hard clay, upon which is spread a mat, woven of reeds, where the whole family sleep, in a row, during the warm weather. This open gable is about 10 ft. deep, the other half of the open ante-chamber forms a stairway leading down to the subterranean chambers, generally two or three in number, where the food is cooked, and where the family live in winter; the sides of the huts are built of composite material mixed with straw and plastered over with mud. The roofs are made of interwoven branches of trees, covered with straw and reeds, with a coating of earth on the outside. There is no furniture whatever in these houses—not even a table or bed, and a more wretched-looking abode cannot be imagined for civilised human beings. There are generally two families at least in these huts, all of them dirtier than the others. Recently a Russian prince, who was visiting us, told the Bulgarian woman who was mistress of the establishment, that 'she could not be a Christian unless she kept herself and children cleaner;' the reply was, 'God had made them so, and she could not help it.' A colleague paid this woman half a franc a day to wash her children's faces, but she soon struck for higher wages, and my friend gave up his philanthropic endeavours in disgust.

DEVILLE *v.* THE HARROGATE IMPROVEMENT COMMISSIONERS.

MR. S. W. NORTH has forwarded to us the following statement of the state of the subscription started to reimburse Dr. Deville for the expenses incurred in this action. We regret to see that sufficient funds have not been collected to relieve Dr. Deville from the pecuniary sacrifice made by him on behalf of his fellow medical officers of health. Judgment was given in the case in July last, in favour of the plaintiff (Dr. Deville) on all points. The bill of Dr. Deville's solicitor was taxed a few days ago, and the costs of this trial, so far as Dr. Deville is concerned, are, total of Messrs. Paley's account, 326*l.* 16*s.*; less to be paid by the Harrogate Commissioners, 182*l.* 9*s.* 6*d.*; leaving 144*l.* 6*s.* 6*d.* to be paid by Dr. Deville. This is exclusive of his personal costs in attending the trial, journeys to London etc. Towards the payment of this sum have been received

subscriptions to the amount of 69*l.* 12*s.* 6*d.* Mr. North very justly remarks that in prosecuting this action, Dr. Deville has done public service for which he deserves the sympathy and assistance of the public health service. By exposing himself to the risk of a loss of 500*l.* or 600*l.*, and an actual loss of nearly 150*l.*, he has gained no personal advantage beyond the vindication of his character, but he has established an important principle which cannot fail to promote the independence of medical officers of health. Mr. North, therefore, proposes to keep the account open for a month, and in the meantime will be glad to receive the subscriptions of those who feel that Dr. Deville ought not personally to bear the cost of these proceedings. A balance-sheet showing the subscriptions and payments will be forwarded to each subscriber.

THE RECENT MILK CASE IN PLYMOUTH.

THE public will in time possess a very fair knowledge of the composition of genuine milk, of the astute and versatile cunning of the dairyman, and of the accuracy of modern methods of analysis. These remarks are suggested by an incident at once diverting and instructive, which has recently occurred in the west of England, the facts of which are briefly as follows :—It would appear that a little while ago the Stonehouse dairymen had not alone been prosecuted, but also—however incredible the narrative—been fined ; and their lactophorous brethren of Plymouth at once called a private meeting, the result of which would seem to be, that the chairman, a Mr. Sayer, arose one morning with the dawn, selected a cow and a constable, carefully milked a small portion, sufficient to fill three bottles—two of which, duly sealed with the constabulary seal, were respectively forwarded to Mr. Wynter Blyth, the analyst for Devon, and to an analyst residing in Plymouth, whilst the third, at first retained by the police, was subsequently analysed by Mr. Wigner. The result was one which every dairyman in England and every analyst could have foretold. The cow neither watered her own milk, nor did she skim it, as a contemporary suggests, but the milk was as destitute of cream as if it had been drawn from a tap put at the bottom of a full milk can, which had been standing for some time, in other words it was 'fore milk,' that is the first portions of a fractional milking, and though direct from the cow, was returned by the three analysts as practically destitute of cream, and therefore in the sense of the Sale of Food and Drugs Act, adulterated, that is, it was not of the nature and quality demanded by the customer. For our part we do not see how, if milk, said to be new milk, is sent to an analyst and found creamless, he can do any other than condemn it as adulterated. The recent decision of a Dublin magistrate that fore milk and strippings should be sold together would probably be upheld in a higher court ; at all events we fail to see any essential difference in abstracting cream directly by mechanical means or indirectly by physiological tapping. In both the milkman gets the advantage, the customer the loss.

GLASGOW EXTRA WATER-SUPPLY.

EVERYONE knows that the city of Glasgow is supplied by pure water brought at an immense expense from Loch Katrine, and that the city of Manchester is about to copy the Scottish precedent by constructing an aqueduct between its boundaries and the Lake district. It was found, however, at Glasgow that a supply of river water for manufacturing purposes, in the east end of the city particularly, would prove beneficial, and some years ago the corporation obtained an Act to construct some extensive works on the banks of the river Clyde before it reaches the city. These works have been commenced for some time under Mr. J. M. Gale, C.E., and are now approaching completion after an outlay of about 30,000*l.* This 'river-supply works' is situated at Westhorn, about two and a half miles up the north bank of the Clyde, and the main water pipe is carried westwards to Springfield Road, and thence to any manufactories which need to be connected with it. The two reservoirs can contain about 800,000 gallons, and are constructed of earth and clay puddle outside, and concrete and brickwork lining inside, in fact, in the best manner. The combined horse-power is about 150, and is intended to raise the water some 50 feet above the ordinary level.

The people of Glasgow have, we think, acted wisely in providing a separate supply for manufacturing purposes, and so conserving the pure supply as much as possible, anticipating the time when the city shall have become hugely enlarged. This procedure will also, we should imagine, render a new conduit unnecessary, even at any future time. Without doubt, all this has been taken into account by the authorities of Manchester, and manufacturing necessities provided for from the Irwell. We wish we could congratulate the metropolis upon such a wise scheme of pure lake-water supply, and surely one must be carried out some day. The sooner we can dispense with our present river-supply, or leave it to supply the boilers of our engines only, the better for at least 4,000,000 of the queen's subjects.

Special Reports.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

'ON CERTAIN LAWS OF POPULATION.'

By DR. FARR.

DR. FARR said that the unity of the human family was an accepted scientific truth, and all races and nations were alike endowed in structure, intellect, passions, and faculties ; and according to the most recent calculations—those of Petermann—the population of the whole world was now 1,424 millions. In the last century some thinkers called in question the account of the origin of mankind as stated in the Book of Genesis, and held that it was impossible that in the period so many could have descended from two ancestors—Adam and Eve. Euler undertook to meet the objection. He showed that by a process of doubling the population from one pair it might amount to any conceivable number. It had been laid down that a population can double itself in twenty-five years. It was true that if the population increased to its present pitch in 5,880 years, it might have doubled itself every 200 years. The inhabitants of the earth would in 200 years approach 3,000 millions ; and at the same rate the difference between the birth-rates and the death-rates was nearly constant, although the rates themselves varied widely. To every unit of life in England there was annually ·03492 added by birth, and ·02231 deducted by death. The rates of increase was 1·01261, which implied that at that rate the population would be doubled in 55·3 years. Taking 1,000 as the basis, the birth-rate was 34·92, and the death-rate 12·31, in England and Wales. Carefully-prepared statistics showed that at these rates of increase the periods of doubling in eight of the states of Europe would be as follow : England and Wales, 53·3 years ; Sweden, 61·1 ; Prussia, 64·3 ; Netherlands, 77·1 ; Austria, 86·0 ; Spain, 93·9 ; Italy, 100·5 ; and France, 361·3 years. And what did we find actually going on in English districts? In fifty-six populous districts the death-rate was ·0251, and the birth-rate was ·381 ; and consequently the rate of increase was 1·0130. In fifty-four healthier districts the death-rate was ·0167 ; that was ·0084 lower than in less healthy districts. The natural increase of population in the healthiest districts was 1·0134. If the districts were arranged in four groups, the death and birth-rates were ·0251 and ·0381, ·0220 and ·0356, ·0192 and ·0323, ·0167 and ·0301. These four groups of districts, therefore, would double their population in nearly the same periods, as their rates were 1·0130, 1·0136, 1·130, and 1·0134.

Thus within certain limits the reduction of mortality had no absolute tendency to accelerate the natural increase of population. Where the death-rate reached a much higher pitch, the birth-rate no longer kept pace with it; but the diminution of the mortality of England by sanitary improvement was in no danger of multiplying by multiplying men beyond the means of subsistence. Experience proved the contrary, and therefore to keep a population stationary or to retard national growth there was needed neither war, pestilence, or famine, nor a war between man and man, but between the lowest forms of life and human life. He introduced the term zymotic to characterise the class of epidemic, endemic, and contagious diseases. It is from the Greek word *Zume* (leaven), which occurs in 'Hippocrates' and the Greek Testament, and it implies that these diseases have this in common with ferments—that they spread, multiply, and effect transformations of organic matter. Thus the transparent lymph in a small-pox pustule (*variola*) contains a multitude of small microscopic bodies (*variolads*), which, introduced into the body of a single man, multiply into millions, and under certain conditions, infect a whole city. They grow, multiply, and die, and in these processes prove fatal to thousands of men. Scarlet fever, measles, whooping-cough, typhoid fever, cattle plague, and cholera are due to bodies. Each specific 'zymad' produces its zymotic disease. Nor can the different species be differentiated in any other way than by their effects on the living body. When were they created? We do not know. We do know when they were first described, and we know that in the sense of Mr. Darwin they give rise to varieties. The small-pox matter is sometimes quiescent. Then varieties of it spring up, which spread rapidly. Summer cholera was for centuries common in London. Suddenly in Asia a new variety sprang into existence and ravaged Europe. We know under what wretched conditions this variety was created, under what conditions typhus that killed judges has been produced in prisons, erysipelas, pyæmia, puerperal fever, scurvy, gangrene, dysentery in hospitals, armies, and fleets. Some varieties, like putrefaction, can be raised at will. Upon the other hand, milder can be substituted for malignant varieties, as in the instance of vaccine substituted for variola. Some forms of pestilence have been extinguished. Thus, plague that once ravaged London every twenty years has been stayed; and by stopping the supply of infected water Asiatic cholera loses its terrors. By sanitary measures which are known and are at the hands of the physician, engineer, and administrator, many zymotic diseases can be subdued, if not extinguished. In striving after this glorious end we cannot now be terrified by the phantom of population increasing in geometrical progression. If the birth-rate could be reduced, it would be wise in this country to accept that policy which has been advocated by Malthus, J. S. Mill, and Dr. Dugdale, and practised by the French peasant. Admirable as was the thrift and industry of the French peasant, he (Dr. Farr) could no more hold that England was called upon to practice his social philosophy than to revolutionise our agriculture by either cutting up the land into infinitesimal parcels, or ceasing to employ in its culture the several capitals of the landlord in acres, the farmer in stock, the labourer in thews, sinews, and inherited skill. Many current French statists now regarded with apprehension the declining population of France. This policy was put forward to lessen the misery of the working classes and to raise their wages by lessening the supply of labour. Their misery had been diminished and their wages raised. Under the opposition policy of increase, let them, then, go on as heretofore in keeping up their numbers and trusting in God, marrying and giving in marriage, as our returns showed they did, in prosperous times, and waiting in adverse times.

After some remarks by Lord Houghton and Mr. Walford, Mr. W. L. Collier considered that those statists who had attacked the doctrines of Malthus and J. S. Mill, endorsed by Cairns and Senior, had failed. Had the working classes been considered with families of seven or fifteen, as the case might be, struggling for existence on 16*s.* a week? Dr. Farr said marry first and sustenance would come after, but the higher and middle classes reversed the position. They did not marry until their means enabled them to do so with fair prospects of comfort, and yet they preached a doctrine of imprudence and improvidence to the working classes. Those classes, however, would find that J. S. Mill was the best friend they ever had. The doctrine of Malthus was based upon the fact that the poor we always had with us. But Mill held that we ought to have no poor in the sense of abject indigence. In the discussion which followed, Mr. T. R. Bourne said that in those cases where there were families of five and food only for two, it would mostly be found that what was wanted had been consumed in drink. As a matter of fact, the large families did the best, and all the greatest men in science and as statesmen were mostly members of large families and younger sons, upon whom early struggles for mental growth had produced brilliant results. Mr. George Hurst thought population had dangerously increased in this country. Mr. Turner said that those who were afraid of the ratio in which the population increased seemed to forget that food was increasing on all sides in even a greater ratio. Mr. Fisher, a Canadian, said that those who thought emigration the proper remedy for overpopulation should remember that the Colonies did not want the children of ricketty paupers. Lord Fortescue must remind the section that Mr. Chadwick had been for years recognised by all Europe as one of the most distinguished economists of our time, and, indeed, as such had had the honour conferred on him of being made a member of the French Institute; that Dr. Farr had also long been recognised as a high economic authority; and both of these—to whom, as an ex-Secretary of the Poor Law Board, he could add, in a much humbler degree, himself—had always strenuously inculcated thrift and prudence. The discussion closed with a vote of thanks to Dr. Farr.

DWELLINGS OF THE POOR.

MISS HEATON, of Leeds, addressed the section on the question of the dwellings of the poor. They should live under conditions in which health was possible, and they should also know what to do in order to preserve their health. The best way to secure the former was to adopt the plan introduced in London by Miss Octavia Hill of securing blocks of ill-ventilated buildings and those which were badly supplied with water, to put them in habitable condition, and then let them at a moderate charge to the poor. That plan had been tried in Leeds, and, so far as it had gone, with complete success. After paying 5 per cent. interest, the Industrial Dwellings Company in that town restored what remained to the fund or gave it away to the inhabitants of the houses. The improvement in the health of Leeds was in some measure due to the improved suburbs of the town, where the working classes now flocked, giving up former unhealthy habitations in the centre of the place. But when the poor had dwellings adapted to secure health, they must be taught the necessary conditions for securing it. National schools and board schools would provide for the future generation, and to meet the want in the case of the present generation she suggested that, as in Leeds, free lectures on health might be given at very little expense. She hoped some public-spirited lady or gentleman would take the matter up, and believed confidently that if the subject was properly made known there would be good audiences, which would be exceedingly interested were the lectures made popular.

Dr. Farr said the movement in Leeds was practicable and useful, and deserved imitation, not only in Plymouth, but in other towns.

REPORT OF THE SOCIETY FOR THE EMPLOYMENT AND IMPROVED LODGING OF HOP-PICKERS.

THOSE interested in the well-being of the hop-pickers, who flock in thousands from London to the hop districts, will be glad to know that the tenth annual report of the Society for the Employment and Improved Lodging of Hop-pickers is the most satisfactory of all its predecessors; for it not only shows that substantial good work has been already done, but that there is a very definite prospect that before long the main object in view will have been fully attained. The fact that such names as those of the Archbishop of Canterbury, the Marquis of Abergavenny, Earl of Darnley (president), Earl Sydney, Earl Romney, Sir Edmund Filmer, Sir W. Hart Dyke, M.P., H. A. Brassey, M.P., the Right Hon. Gathorne Hardy, M.P., Mr. J. J. Ellis, and of many of the most influential hop-growers, appear on the list of its members is a guarantee of the excellence of the society's objects, while the indefatigable labours of the Rev. J. G. Stratton, of Ditton Place, Maidstone, who has from the first fulfilled the duties of secretary as a 'labour of love,' assisted by several of the clergy of the hop districts, have materially helped towards the success already secured in this philanthropic work.

There are within easy reach of London 58,000 acres of hops, and as far as can be ascertained the available supply of hop-pickers from the metropolitan district may be put at upwards of 36,000, of whom about 25,000 have to be provided with some special lodging and accommodation during the month or six weeks of the picking season.

The labours of the society have been directed to obtaining an improvement in the lodging provided for the immigrants. The action of the society in calling attention to the overcrowding of the hop-pickers in the lodgings provided for them, with its concomitant physical and moral evils, and thus creating a strong public opinion that it should be rectified, has gradually brought about some amelioration, and several landowners and hop-growers have recognised their responsibilities in a practical manner. It was, however, felt that the evil could not be fully coped with except by special legislation, and hence, at the suggestion of the society, the following clause was inserted by the present Government in the Sanitary Laws Amendment Act of 1874—'Every sanitary authority may make by-laws, to be confirmed by the Local Government Board, for regulating the lodging and other treatment of persons engaged in hop-picking in the district of such authority.' Several local sanitary authorities at once took up the matter, amongst them the Bromley Union, which, to its credit, took the initiative in framing a series of excellent by-laws; these, after some revision, were accepted by the Local Government Board, and are now recommended by it for adoption by other sanitary authorities. By these by-laws proper arrangements are to be made for the construction, ventilation, and lighting of the buildings occupied by hoppers, a due floor space is to be allowed for each person, screens are to be erected between beds to ensure privacy where needed, and a good water-supply, cooking houses, and other conveniences are to be provided. Six only, however, out of the twenty-five sanitary authorities in Kent, Surrey, and Sussex, have adopted by-laws sanctioned by the Local Government Board. The society, notwithstanding, does not seem to think this by any means discouraging, as the committee says in its report that 'further time is required for the voluntary action of the authorities concerned,' and thus does not go so far as its president, who thinks that 'the sooner these permissive by-laws are made compulsory the better.' We trust that the local sanitary authorities will soon see not only the propriety, but the absolute necessity of taking action in the matter, and dealing with what still remains of the evil as public decency and common humanity demand. If, however, they continue to remain passive or to show evasive tendencies, there will be no alternative but to seek compulsory powers under a fresh amendment act, as the Local Government Board itself seems to intimate. In either case there is, as we have said, every prospect that the ten years' labours of the society will soon be crowned with complete success.

Medical Officers' Reports.

BATH.—Dr. Brabazon states in his last quarterly report, that the annual rate of mortality was 23·9 per 1,000 population, which was above the average for the corresponding quarters of the last four years. He reports that the number of deaths from zymotic or preventable disease was small, and then remarks that it must be remembered that the longer the period of immunity from these diseases, the larger will probably be the number attacked at the next visitation, as there will be a proportionally larger number who have not undergone the ordeal of a previous attack. We agree with him in this remark, but scarcely understand how he can call these diseases preventable, and yet acknowledge that the chief prevention is a previous attack. Dr. Brabazon also states that a greater number of deaths occurred in children under five years old, which he attributed to the want of proper precaution rather than to local sanitary defects.

NEWTON ABBOTT RURAL.—During the second quarter of the year 121 deaths were registered, equal to an annual rate of 19·6 per 1,000; 45 deaths were in children under five years, and 25 were due to zymotic diseases. A large number of these were from scarlet fever, which seems to have been very prevalent in the district. In the parish of Bovey Tracey, 10 fatal cases occurred during the quarter, where the disease had been aggravated by overcrowding, dirt, and want of ventilation. In the Liverton district, scarlet fever appeared in three children attending the village school, which was closed on Dr. Armstrong's advice, and only two other cases followed. At Coobeinteignhead the same disease was introduced by an apprentice sent home with the disease upon him. In dealing with these epidemics, Dr. Armstrong complains of the difficulty of convincing parents and others of the necessity of keeping those infected and recovering separate from the healthy for some weeks after recovery, as neglecting this precaution frequent reappearance of the disease is the rule. The 'village school' also played an active part in spreading a sharp epidemic of small-pox in Hennock. The first case occurred in the schoolmistress, and the infection could only be traced to a visit from her sister from London during the Easter holidays. In May, seven cases were found in as many separate houses, the patients all having attended the school; this was at once closed, and other measures adopted by the sanitary authority to limit the spread of the disease. The water-supply of Bovey is complained of as unsatisfactory, not without good cause. The inmates of 34 houses in one part of the town are dependent upon open water-courses, the mill-leat, or river. Some of these receive a good deal of sewage and surface-water; failing these, the option is, 'Beg water where you can.' The supply for every part of the village is most deficient, and the inhabitants are frequently put to great straits for drinking-water, while the present condition of things could be easily and most inexpensively remedied. With such a limited supply, warm baths, an essential part of the after-treatment of scarlatina, will be rarely adopted, and the long continuance of the disease in the village, and a death-rate of 29·8 per 1,000 in the district of Chudleigh, of which Bovey forms a part, are some of the results of this want of water combined with other sanitary deficiencies.

BIRMINGHAM.—Dr. Hill reports that during the quarter ending June 30 there were 4,009 births and 2,365 deaths, which are in excess compared with the corresponding quarter of last year. The birth-rate was 42·48 and the death-rate 25·06 per 1,000 population, against an

average of about 22·5. The increased number of deaths were chiefly from measles, whooping-cough, and bronchitis; the annual death-rate from zymotic diseases being 3·8 per 1,000. The sanitary work was actively carried out, as nearly 4,000 nuisances were reported on, above 4,400 notices issued, and 419 summonses taken out. There were thirty-seven samples of food analysed, of which only four were adulterated, viz., three of milk and one of oatmeal. The rainfall amounted to 7·05 inches, which is half-an-inch in excess, whilst the mean temperature was 2° below the mean, which accounts for the unusual mortality from inflammatory diseases of the lungs.

Law Reports.

VACCINATION OFFENCES.

C. LEYWARD, of 10, Halton Place, was summoned for neglecting to send a certificate of the unfitness of his child to be vaccinated. The vaccination officer for St. Mary's having proved the case, the defendant was fined *2s.* and costs.—G. Lowe, 161, Shepperton Road, was summoned for neglecting to take his child on the 31st ult., to the medical officer for examination. The defendant offering no defence, Mr. Hosack fined him *2s. 6d.* and costs.

ALLEGED NUISANCE FROM PUBLIC SEWERS.

AT the meeting of the rural sanitary authority their attention was called to the Alfreton sewers flowing into the Oakerthorpe brook; it was decided to forward a copy of the South Wingfield committee's minutes to the Alfreton local board. A communication was read from the clerk of the local board, stating that the documents were handed to Mr. Morewood, who said he would do his best to try and purify the sewage in the course of a few weeks. It was unanimously decided to serve a notice on the Alfreton local board, requiring them to abate the nuisance within twenty-eight days, or legal proceedings to issue.

UNWHOLESOME FIGS.

JOHN WRIGHT, grocer, etc., of Elmgrove, Lower Norwood, appeared to a summons for exposing for sale figs unfit for food. The inspector stated that in consequence of receiving a complaint that some children, after partaking of figs bought at the defendant's shop, became unwell, he visited the shop. He there found 3 lbs. of figs exposed for sale, unsound, and quite unfit for food. Dr. Farr and Dr. Hunter had both examined the figs, and discovered within them a large number of minute living organisms. The figs were brought to this court, seen by Mr. Ellison, and directed by him to be destroyed. The defendant said he was not at home when the inspector called. His wife, however, told the inspector the figs had got a little damp. Mr. Ellison adjourned the case.

BREACH OF THE FACTORY ACT.

AT the Sittingbourne Police Court, William Bacon was summoned at the instance of Mr. Redgrave, factory inspector, for allowing one son under ten to be employed in the manufacture of bricks at Borden, and neglecting to cause another son, aged twelve, also employed there, to attend school half a day as required by the statute. Another man, named Wiles, was also summoned for neglecting to cause his son, who was under thirteen, to attend school half a day. The occupier of the brickfield was summoned in two of the above cases, namely, for allowing one child under ten to be employed in the manufacture of bricks in his brickfield, and for failing to produce the certicate of school attendance of the boy Wiles. Mr. Redgrave stated that he found three boys under age at work in this brickfield. He sent them off on his first visit, but they were there again when he visited the field on another day. A fine of *1l.* was imposed in each case.

ADULTERATED MILK AT A WORKHOUSE.

PETER HEADDON, of Horfield, was summoned by Mr. Lowick, sanitary inspector of the Barton Regis Union, for selling adulterated milk. Mr. Benson, on behalf of the defendant, pleaded guilty, but made an explanation. Defendant had entered into a contract to supply the Barton Regis Union, and he had also contracted to supply some other persons. Some of the milk so purchased was supplied to the Union, and turned out to be adulterated. The milk on being analysed, it was stated, was found to contain 20 per cent. of water. The defendant was fined in the mitigated penalty of *5l.* and costs.

NEGLECT TO CARRY OUT SANITARY LAW IN IRELAND.

AT the Naas Petty Sessions, Mr. E. Molloy, executive sanitary officer, summoned Eliza Walsh for having four houses at Kill unfit for human habitation. Mr. Molloy stated the case on behalf of the board. He said that in November last the sanitary medical officer reported to the guardians that there was a yard in a filthy state, and that four houses, one of which has no back door, were unfit for human habitation. Dr. Hayes, sanitary medical officer, stated that so far back as November 28 last, he reported this case, and nothing had been done in the matter. The Clerk of the Petty Sessions.—The then defendant is dead. Their worships dismissed the case, as they considered, after hearing the evidence, that they had not the power to make the order sought for.

A POLLUTED WELL.

MR. O. C. T. EAGLETON, a solicitor, of Chancery Lane, was summoned by the clerk of the Richmond Union Rural Sanitary Authority, in respect of a well at 71, Lilian Road, Barnes, which was so polluted as to be injurious to health. The defendant did not appear, but he was represented by a gentleman, who said there were seventy houses in the street, each having a well. Mr. Wood stated that proceedings had been taken in other cases, and the wells had been closed. Mr. James Adams, the medical officer of health, proved the state of the water, and said there were two cesspools in addition to the well, the ground, consisting of sand and gravel, being highly favourable for percolation. The defendant's representative said the houses had been in existence for ten years, and there had been no complaint until this time. Mr. Wood said that was because the water was getting worse. Mr. Woolrych made an order for the well to be closed in fourteen days.

THE RIGHTS OF TRAMCARS.

AT the close of a case tried before the Sheffield magistrates, in which the Tramways Company were the complainants, one of the magistrates remarked that many of the drivers of the cars drove as if they thought the whole world ought to make room for them, but the real fact was that they must make room for all the world. The 57th section of the Act enacted that, notwithstanding anything there might be in the Tramways Act, the company should not acquire any right other than that of using the road. Therefore, if they had no right beyond the use of the road, their right stood like the right of all the rest of the public to the use of the road, and they had no priority. By the 62nd section of the Act it was also provided that nothing in the company's Act, or in any by-law, should abridge the rights of the public. He did not at all admit that the slow traffic was to cross the road to allow the cars to pass when the other side was full of business, as the practice was a dangerous one, though it might be adopted when convenient. The rights of the public had first to be considered, not the rights of the company. The Town Council could pass by-laws, but no by-law could abridge the rights of the public, and when it did that it was void.

COMPLAINT AGAINST A CORONER.

AT the meeting of the East Moulsey local board the surveyor, Mr. Goodall, reported that a case of suicide occurred on August 16, and that the inquest was not held until August 23. The coroner, Mr. W. Carter, had written to the Home Secretary on the subject, alleging as a cause for the delay the great amount of work he had to do at the time. This explanation, however, was not deemed sufficient by the Moulsey local board, and they have written to Mr. Carter to that effect.

OVERCROWDING NEAR LAUNCESTON.

THE Launceston magistrates investigated a charge made against Simon Adams, an incorrigible, who did not appear, and who was summoned for committing a nuisance by allowing his house at Trebursye to be overcrowded. Mr. Williams, medical officer of health, said he visited the house on August 21, and the air within was positively poisonous. There were two rooms only, and the father and mother, together with nine children, slept in one room. The Bench ordered that the nuisance should be abated within a week, a special sessions to be held to receive the inspector's report.

NEW ROAD THROUGH A CHURCHYARD.

THE Chancellor of the Diocese of London (Dr. Tristram) has had an application before him for a faculty or license to remove some tombstones and a number of bodies from one portion of the burial ground of St. Dunstan, Fleet Street, to another, in order to a form a new street between Chancery Lane and Fetter Lane in continuance of Breams Buildings. A petition had been filed by the rector and churchwardens of St. Dunstan in support. The churchyard had been closed for a number of years by an Order in Council, and a faculty was required to remove the human remains and decently to re-inter them in another part of the closed ground. In answer to a question of the learned Chancellor, it was stated that the Ecclesiastical Commissioners and the Commissioners of Sewers of the City of London were co-operating in the application, and that the court by the parties would be asked to grant a faculty to remove the tombstones and bodies in order to carry out the public improvements which would be made by the formation of a new street. The court required evidence in support of the application, and the matter stood over.

'LINE OF FRONT.'

MR. LEIGH, at Chiswick, was summoned, under the Public Health Act, for building beyond the line of frontage. The defendant's house was legally erected at the side, but in advance, of an old house called The Cedars, standing in large grounds. Since that time houses had been erected on the other side standing 5 ft. back from the line of the defendant's house. Two houses in large gardens were on the other side of the road. The defendant had commenced building a bay window, which was the subject of dispute. Mr. Finnis said application was made to the Improvement Commissioners to approve of the plan, but they refused. He contended that it was contrary to the Act to build beyond the line of frontage without the consent of the Commissioners. Mr. Wontner said all the houses were detached. Mr. Finnis said that had nothing to do with the case. He relied on the words 'on either side.' The question turned on the word 'on,' and he argued that it was an equivalent for 'at' or 'near.' Mr. Paget, looking at the ruling of Mr. Justice Blackburn, said the impression on his mind was that the street commenced at a point beyond the defendant's house. Mr. Finnis said it was an important case for the parish, and he should ask the magistrate to grant a case. Mr. Paget said as it was a question of fact he was not entitled to one. He thought it was a matter for arrangement. Mr. Finnis said a neighbour objected to the bay window. Ultimately the summons was adjourned *sine die* for an arrangement.

ADULTERATED MILK AT POPLAR.

T. LLOYD, milk-seller, of 319 Roman Road, Bow, was summoned for selling milk adulterated with 13 per cent. of water. Defendant said that he kept two kinds of milk, one at fourpence and one at fivepence; and as the witness Lennard had not asked for the better quality, he could not see that the milk had been—in the language of the summons—sold 'to the prejudice of the purchaser.' His wife told the witness that the milk was not fit to be analysed, as it was only milk and water, but that if he had asked for the best milk he would have been supplied with it.

Mr. De Rutzen said that if it were possible to aggravate a bad case by a worse defence, the defendant had most certainly done it. In his opinion it was a very serious thing for poor people to be imposed upon by having inferior articles palmed off upon them for the best, and it made the matter very much worse for the defendant to have the effrontery to tell the court that it was quite a usual thing for him to do; and to mark his sense of such conduct he should fine him 4*l.* and 23*s.* costs.

NUISANCE FROM MINE WATER.

VICE-CHANCELLOR LITTLE, sitting at the Chancery Court of the County Palatine at Liverpool, had before him an application for an interlocutory order on behalf of T. Lancashire, S. Lancashire, and A. Smith, owners of certain lands at Bedford Leigh, to restrain J. Speakman, proprietor of an adjoining colliery, from discharging his pit water in such manner as to flood an occupation road, to poison certain cattle-drinking pits, and otherwise to damage the plaintiffs' property. The case for the plaintiffs was that the nuisance commenced in June, 1876, but remonstrances having been made, the defendant was able to make an arrangement with the London and North-Western Railway Company, by which he discharged the water into a drain belonging to the Company. Some dispute, however, had arisen, and the flow of water recommenced in June last, the pumping going on night and day. The case for the defendant was that there was a natural declivity in the ground towards the plaintiffs' lands, and that the side of the lane in question formed a natural water-course, which relieved the defendant from the onus sought to be put upon him. His Honour, in delivering judgment, said it was clear from the evidence that the plaintiffs had sustained damage. He should therefore grant the order asked for, but would give the defendant one month to remedy the evil.

THE OWNERSHIP OF STREET LAMPS.

P. BRADY, a van boy, was summoned, under the Metropolitan Local Management Acts, by Messrs. Samuel Pontifex and Co., for 1*l.* 15*s.* 6*d.*, the amount of damage done to a street lamp broken through the defendant driving a van carelessly. Mr. Wells said that Messrs. Pontifex contracted with the Commissioners of Sewers to keep the street lamps in repair, but, to their annoyance and injury, hundreds were broken every year, and the percentage of offenders they were able to detect was very small indeed. In this case the driver left the van and two horses to be driven by the defendant, a boy much too young to be entrusted with such a responsibility. The result was that he did not pull the horses off when his van was near the lamp, and damage to the amount of 1*l.* 15*s.* 6*d.* was done, which they now sought to recover. Mr. Dalton took an exception to the proceedings, as the contractors were not the proper persons to institute them. The lamps were the property of the Commissioners of Sewers, and they ought to have taken out the summons. Mr. Wells said that was not necessary. He had taken out many summonses in the metropolitan districts in the same way as this, and the proceedings had always been upheld by the magistrates. The point in dispute was argued at some length, and ultimately Mr. Alderman Ellis dismissed the summons, observing that the Commissioners of Sewers could, if they pleased, take out a summons in their name.

SAUSAGES.

J. COUSINS, a sausage-maker, of Brooksby's Walk, was summoned for having on his premises meat unfit for human food. It was proved that the defendant had by his agent bought a quantity of meat for 2*s.* 6*d.* a stone. The sanitary inspector had his attention called to the meat, and he found that it was part of an animal that had suffered from lung disease. The meat was totally unfit for human food. Mr. Hannay asked what was the price of good meat fit for the food of man. He did not mean fit for sausages. Defendant's buyer said that 5*s.* a stone would be about it, but that meat would be of no use for sausages. It was stated in court that the defendant had relinquished the trade. Mr. Hannay imposed a fine of 10*l.* and 12*s.* costs.

A 'DANGEROUS' BUILDING.

AT Wandsworth, the owners of the Castle Inn, Tooting, were summoned at the instance of the Metropolitan Board to show cause why the building, which was alleged to be in a dangerous state, should not be taken down or secured. Mr. Napier, from the solicitor's department of the Board, said the building was erected in 1666. Mr. D. Nasmith said the owners, who had large landed property in the locality, were willing to do all that was required. The district surveyor said he had known the premises for thirty years. One side had been taken down, but the back wall was in a dangerous state. The premises being very old were in that state technically called 'wattle and dab.' He added that the premises were in the course of repair. The builder having stated that the works would be completed in a fortnight, Mr. Paget adjourned the summons.

FORGING CERTIFICATES OF DEATH.

AT the Manchester police court, John Parkinson, undertaker, and Helena, his wife, were brought up charged with having uttered a number of forged medical certificates of death. The male prisoner was placed in the dock first. Mr. Crofton said he was charged with an offence under the Births and Deaths Registration Act, 1874, in having given false information to the registrar of certain deaths. He was agent for the Prudential Assurance Company, and the prosecution had reason to suspect that he had an ulterior motive in what he did. He obtained forms of certificates of death, given by medical men, and filled in the names of persons alleged to have died, and signed them with the name of some medical man. He took these certificates to the registrar of the district, and tendered them, in order that the death might be registered. After registration, he went to the assurance company and entered the 'death' in their books. This was done in a great number of instances, and they proposed to proceed against the prisoner for uttering certificates knowing them to be forged. Mr. Crofton said the first case was that of the alleged death of 'Ann Jane Halliwell.' It appeared that on August 8 the prisoner went to the deputy registrar and produced to him a document purporting to be a certificate of the death of Ann Jane Halliwell, aged twenty-six, on August 7, it being signed with the name of Mr. Frank Holmes, surgeon in Gorton. The 'deceased' was said to have resided at 12, Wainwright Street, Gorton. He (Mr. Crofton) would produce a neighbour, who would say that no person of that name had lived at No. 12 for five years, and also Mr. Holmes, who would state that he had never signed the certificate produced. The certificate described at length the diseases from which Halliwell had suffered, the duration of the disease, the age of the patient, and the date of the death; in fact, it was an exact copy of the document given in cases of death. Inspector Davenport said he searched the house of the prisoner, and found about twenty blank certificates similar to the one presented to Mr. Hallsworth. He found on the prisoner a book containing handwriting which was similar to that on the certificate. Prisoner was committed for trial at the assizes, bail being refused. Helena Parkinson was discharged.

THROWING REFUSE INTO THE THAMES.

AT Greenwich, J. Whitcomb and J. Moyce, 20 and 14 respectively, were charged with discharging gas tar refuse into the Thames. Inspector Francis, of the Thames Police, said that on the previous afternoon he saw the prisoners on a barge lying off the Foreign Cattle Market, each working a pump alternately. The discharge was perceptible on the water and bank of the river as far as Greenwich. The owner of the barge was G. F. Whitcomb, of Shere-road, Deptford, lighterman, who said that in consequence of the late heavy rain, the barge had been filled, and he had ordered it to be pumped out. Mr. Balguy imposed a fine of 20*s.* upon Whitcomb, and dismissed Moyce.

SETTING A DOG AT A BOY.

AT the Glasgow police-court, D. Mullan, coach builder, was charged with having hounded a dog on a boy in his yard. He pleaded not guilty. It appeared that a number of boys were hanging about the gate of Mullan's yard, and Mullan, who, it is said, is very much annoyed by boys coming into the yard, caught hold of the boy, who was standing a little within the gate, and barring the gate, called for the dog to be let loose. The dog fastened on the boy, and bit him on the leg and arm. So severe were the boy's injuries that he had to be removed to the infirmary, where he had been confined till now. It was pleaded in defence that a number of boys had been throwing stones, and otherwise annoying Mr. Mullan, and that the dog, seeing its master attacked, had got out of its kennel and sprang to his assistance. After the evidence, the magistrate said there could be no doubt that the boy had been bitten, and bitten severely, by the dog of the accused; and that immediately before the dog fastened on the boy, the accused had been heard to say, 'Let loose the dog.' It had also been proved that the dog could not have unloosened itself. He therefore found the charge proven. There was no doubt that the boy had no business there, but that did not entitle the accused to hound his dog upon him. The injury being serious, he would impose a fine of two guineas, or fourteen days' imprisonment.

Legal Notes and Queries.

BUILDING BY-LAWS.

PART of a township was formed into a district under the Public Health Act, 1848. In consequence of a builder having commenced to erect new buildings such as would not satisfy the requirements of the by-laws of the board just outside the boundaries of their district, the local board asked the Local Government Board for an order to extend the district so as to take in the site of the above buildings, which order was granted, and the Act confirming it received the Royal assent in May last. Before the order came into effect, two other blocks of houses were commenced; but when the order came into effect, he had proceeded as far as the ground floor only. The first set of buildings have not yet been completed. The builder has refused to submit plans. Are the buildings in question new buildings within the meaning of the Public Health Act, 1875? Section 157 seems to except buildings actually erected only. Please to answer the question with respect to buildings erected above the ground floor, but not completed; and with respect to buildings erected only as far as the ground floor.'

[The buildings alluded to above are, we think, exempt from the by-laws under the circumstances stated.—ED.]

DEFECTIVE WELL.

THE correspondence on the subject of the defective well, etc., at Elliott's farm, scarcely appears to be complete, as there is no evidence in it to show what the sanita

authority has done in connection with the representation of the inspector (letter of June 6). Has the board distinctly refused to deal with the case? If so, this fact should be stated.

It is not evident on what authority the inspector requires (letter of April 30) the landlord 'to adopt such measures as may be necessary to ensure a proper supply of wholesome water to the premises,' since the Public Health Act, gives no such power to the sanitary authority, except a public water-supply exists, which it clearly does not in this case.

It may be admitted that the reconstruction of the closet and abolition of the cesspool would in time cure the evil complained of, and these matters might certainly be dealt with under the Nuisance Clauses Act.

The Barnet rural sanitary authority is probably no exception to the general unwillingness of rural sanitary boards to deal with what they call 'private nuisances,' and Mr. Simner's case, though a hard is by no means an uncommon one. The remedy he suggests for the evil under which he suffers, viz., 'that the medical officer of health should be invested by law with the power of enforcing his recommendations if they are not at once attended to,' is scarcely consistent with the general principles of local self-government, since it would invest a mere official with powers which even the sanitary authority does not possess, and could scarcely claim, except in unusual circumstances. The requirements of the law can only be enforced by a court of law, and if Mr. Simner's landlord were to carry out his threat of contesting the attempt to compel him to provide, however indirectly, a supply of drinkable water for the farm, it is possible that the case might involve more difficulties in carrying it through than Mr. Simner appears to contemplate. Under any circumstances, his best course at present will be to obtain an explicit statement through the inspector as to whether the sanitary authority declines to take any action in the matter, and if so, why not?—ED.

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

SLUDGE-DRYING MACHINES.

(*To the Editor of the* SANITARY RECORD.)

SIR,—In a letter which you did me the honour to publish some six months ago, I promised your readers to give the results of an experiment I had then initiated to test Kidd's Sludge Drying Machines. I now proceed to redeem my promise.

The results are as follows: That the small trial machine reduces moist sewage sludge and fæcal matter to a perfectly innocuous dry powder at the rate of 18 tons 6¼ cwts. per week for a very reasonable cost, and although the chimney of our works does not exceed 25 feet in height no nuisance has been created, as can be testified by many medical and chemical gentlemen who have inspected the works in full operation. The dried powder bears an analytical value of about 30*s.* per ton, and is allowed by some of the most eminent agriculturists and agricultural chemists to be most suitable as a diluent for rendering highly concentrated manures more available to the farmer.

About 90 tons of the simple dried sludge powder have been bought by neighbouring farmers, who are quite satisfied that even in that state it shows good results in the crops to which they have applied it.

The cost of carriage and spreading, however, operates against a manure of only 30*s.* per ton value, and I have already many and large orders for a known compound manure I am preparing for next season, which, from its higher value, will bear carriage to a distance.

The mere fact that without nuisance moist sewage sludge can at a cost of about 6*s.* per ton, be reduced in about ten minutes into a dry powder capable of being stored without danger of putrefaction (while kept in a dry place) for any length of time is, I think, a very important one to the authorities of large towns independently of any ulterior gain to be derived from artificial manure making, with regard to which I mean to keep creeping along as I have done with sewage farming. ALFRED S. JONES.

Havod-y-wern Farm, Wrexham, Sept. 8, 1877.

CERTIFICATES FOR INSPECTORS OF NUISANCES.

(*To the Editor of the* SANITARY RECORD.)

SIR,—I see by the SANITARY RECORD of August 10 that certificates are granted to inspectors of nuisances. Will you, Sir (if in your power), kindly inform me what subjects they are expected to pass; also the place where the examinations are held? W. SORTWELL.

[There is no corporate body, society, or association empowered to examine or grant certificates or diplomas to sanitary inspectors or inspectors of nuisances.

By the constitution of the Institution of Civil Engineers, it may admit persons as associates who are not necessarily civil engineers by profession, but whose pursuits constitute branches of engineering, or who by their connection with science and the arts are qualified to concur with civil engineers in the advancement of professional knowledge.

We would advise our correspondent to apply to the secretary of the Institution of Civil Engineers for further information.—ED.]

'AN *OBJECTIONABLE* CHANGE IN BUILDING BY-LAWS.'

(*To the Editor of the* SANITARY RECORD.)

SIR,—A paragraph in your last week's paper, under the above heading (the italics are mine), refers to a suggestion of mine for amending our building by-laws, but not one word of your paragraph explained why the proposed alteration deserved the term '*objectionable*.' Your valuable paper, of which I have been a reader from the commencement, usually contains much excellent and instructive matter, but on this occasion I find none on this subject, which may perhaps be explained, if you did not know what new by-law we propose to substitute for the old one.

I will append it to this letter, and only add that it was proposed after careful consultation with practical builders and other persons interested in local government, and that if there be any really practical objections to what we propose to do, we shall be very glad to know what they are. R. H. BARRETT.

Slough, September 4, 1877.

'Every external or party wall of a new building, the roof of which shall adjoin any other house or building, shall be carried up so as to reach the slates or tiles of such roof (which slates or tiles covering such wall shall be bedded in cement), and so that no roof timber shall be continuous from any one house or building to any adjoining house or building.'

[We adhere to the opinion which we have already expressed, that such a by-law as the above is objectionable, possibly not so much on its merits as by reason of the facilities it affords for deceit and fraud. It will be found impossible in practice to enforce the by-law—that is to say, to enforce the incessant supervision necessary to secure obedience to the by-law. We can readily understand that such an enactment would be received with much favour by 'practical builders,' who as a rule do not live in the houses which they themselves build, and who are not shareholders in fire-insurance companies.—ED.]

Notices of Meetings.

EXAMINATION IN SANITARY SCIENCE.

THE next examination for the certificate in sanitary science of the University of Cambridge will begin on

October 2. Application for admission to this examination, which is open to all whose names are on the Medical Register of the United Kingdom, should be made to Professor Liveing, Cambridge, on or before September 18.

THE AMERICAN SOCIAL SCIENCE ASSOCIATION.

THE next meeting of the American Social Science Association will take place at Saratoga, beginning October 4, and lasting through the week. At a special meeting on Friday, October 7, reports from the Social Economy Department on 'Economy in Building,' and on 'Home Comforts and Amusements at Small Cost,' will be read and discussed. During the congress, papers on the 'Ventilation and Warming of Schools,' by D. F. Lincoln and William Watson, of Boston, and by Frederic Winsor, of Winchester, Mass., will also be read.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

ALLEN, Alfred H., F.C.S., has been appointed Public Analyst for Sheffield at 21*s.* per analysis for the first fifty, and 10*s.* 6*d.* per analysis beyond, in each year.

ANNINGSON, Bushell, M.B. Cantab., M.R.C.S. Eng., has been re-appointed Medical Officer of Health for the Cambridge Urban Sanitary District.

AUSTIN, Mr. Thomas, has been appointed Collector to the Baildon Local Board and Urban Sanitary Authority, Yorkshire, vice Rennard, resigned.

BATTLE, Mr. John Scoley, has been appointed Treasurer to the Corporation and Urban Sanitary Authority of Lincoln, vice Pratt, deceased: 75*l.* per ann.

BURTON, Mr. John Henry, has been appointed Collector to the Kirkleatham Local Board and Urban Sanitary Authority.

COLLINS, Henry, L.R.C.P. Edin., M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the Winslow Rural Sanitary District, vice Denne, deceased.

DAVISON, William, Esq., has been appointed Chairman of the Shildon Local Board and Urban Sanitary Authority.

DODDS, Mr. Matthew Bowser, has been appointed Clerk to the Kirkleatham Local Board and Urban Sanitary Authority.

DRUITT, Mr. James, Jun. (solicitor) has been appointed Clerk to the Bournemouth Improvement Commissioners and Urban Sanitary Authority, from October 1 next, vice Mr. James Druitt, resigned.

EARLE, Mr. J. P., has been appointed Inspector of Nuisances for the Newbold and Dunston Urban Sanitary District, Derbyshire, vice Clark, resigned.

GILMOOR, George, Esq., has been appointed Treasurer to the Brampton Guardians and Rural Sanitary Authority, Cumberland, vice Rowntree.

HALL, Mr. Edward Francis, has been appointed Inspector of Nuisances for the Clay Lane Urban Sanitary District, Derbyshire, vice Bussell, resigned.

HOUGHTON, Mr. Edward, has been appointed Assistant Inspector of Nuisances for the St. Helens, Lancashire, Urban Sanitary District, vice Woods, appointed Surveyor and Inspector of Nuisances to the Penrith Local Board and Urban Sanitary Authority.

KENWORTHY, Mr. Edwin, has been appointed Surveyor to the Handsworth Local Board and Urban Sanitary Authority, Staffordshire, vice Burman, resigned: 300*l.* per ann.

LANE, Mr. Edward, has been appointed Surveyor and Inspector of Nuisances to the Wokingham Local Board and Urban Sanitary Authority, vice Wigg, resigned.

MASON, Mr. Thomas, A.I.C.E., has been appointed Surveyor to the Wimbledon Local Board and Urban Sanitary Authority, vice Rowell, resigned: 250*l.* per annum and residence.

MATHEWS, Mr. George Somers, has been appointed Inspector of Nuisances for the Dorking Rural Sanitary District, vice Spearing, resigned: 120*l.* per ann. for two years.

NEWCOMEN, Arthur Henry Turner, Esq., has been appointed Chairman of the Kirkleatham Local Board and Urban Sanitary Authority.

PARSLEY, Mr. James Whiting, has been appointed Clerk to the Wayland Guardians and Rural Sanitary Authority, Norfolk, and Superintendent Registrar of Births, and Deaths, vice Cubitt, resigned, at 65*l.* per ann., as Clerk to the Guardians, fees as Superintendent Registrar, and such remuneration as Clerk to the Assessment Committee, to the Rural Sanitary Authority, and to the School Attendance Committee, as may from time to time be approved by the Local Government Board.

TRAVERS, Richard, Esq., Manager of the Bishop Auckland Branch of the National Provincial Bank of England has been appointed Treasurer to the Shildon Local Board and Urban Sanitary Authority.

TULEY, Mr. William, has been appointed Surveyor to the Corporation and Urban Sanitary Authority of Chesterfield.

WYLES, Mr. William Ile, has been appointed Clerk to the Harrogate Improvement Commissioners and Urban Sanitary Authority.

VACANCIES.

BARNSLEY CORPORATION AND URBAN SANITARY AUTHORITY OF, Yorkshire. Surveyor.

BELPER LOCAL BOARD AND URBAN SANITARY AUTHORITY, Derbyshire. Inspector of Nuisances: 30*l.* per ann. Application to Joseph Pym, Clerk.

BOSMERE AND CLAYDON RURAL SANITARY DISTRICT, Suffolk. Inspector of Nuisances: 50*l.* for one year. Application, 20th instant, to C. G. Hayward, Clerk to the Authority, Needham Market.

DORCHESTER RURAL SANITARY DISTRICT. Two Medical Officers of Health: 50*l.* each for one year. Applications, 15th instant, to Henry Lock, Clerk to the Authority.

DRONFIELD LOCAL BOARD AND URBAN SANITARY AUTHORITY, Derbyshire. Surveyor and Inspector of Nuisances. Application to George Jenkinson, Clerk.

KENDAL CORPORATION AND URBAN SANITARY AUTHORITY OF, Westmoreland. Assistant Surveyor.

KIRKLEATHAM LOCAL BOARD AND URBAN SANITARY AUTHORITY, Yorkshire. Surveyor: 80*l.* per ann. Inspector of Nuisances: 40*l.* per ann. Medical Officer of Health: 20*l.* per ann.

LICHFIELD RURAL SANITARY DISTRICT. Medical Officer of Health: 100*l.* for one year. Application, 20th instant, to John Bown, Clerk to the Authority.

NARBERTH RURAL SANITARY DISTRICT, Pembrokeshire. Inspector of Nuisances and School Attendance Officer: 52*l.* and 25*l.* per ann. Application, 15th instant, to John Thomas, Clerk to the Authority.

SALFORD, CORPORATION OF, AND URBAN SANITARY AUTHORITY. Surveyor and Engineer, 700*l.* per ann. Application, 19th instant, to C. Moorhouse, Town Clerk.

SHILDON LOCAL BOARD AND URBAN SANITARY AUTHORITY, Co. Durham. Clerk. Medical Officer of Health. Surveyor. Inspector of Nuisances. Collector.

STOCKTON-ON-TEES, CORPORATION AND URBAN SANITARY AUTHORITY OF. Surveyor: 300*l.* per ann. Application, 21st instant to H. G. Faber, Town Clerk.

WHITBY LOCAL BOARD AND URBAN SANITARY AUTHORITY, Yorkshire. Surveyor.

WOODSTOCK RURAL SANITARY DISTRICT, Oxfordshire. Inspector of Nuisances and School Attendance Officer for the Deddington District: 50*l.* and 10*l.* per ann. Application, 17th instant, to R. B. B. Hawkins, Clerk to the Authority.

SANITARY PATENTS.

2743. Improved mechanical arrangements for supplying water to tilt, tip, or swing basins, said mechanical arrangements or part thereof being capable of being utilised for preventing waste and regulating the flow of liquids for various purposes. William Miles Smeaton and John Smeaton, Newcastle Street, Strand, London.

2655. A new disinfecting dry soap in powder, and method of manufacturing the same. Richard Dixon, Garden Lane, Rochdale, Lancashire.

2736. Improvements in the treatment of fæcal matters for the production of manure therefrom. Gerard Wenzeslaus von Navrocki, Koch Strasse, Berlin, Germany. A communication from Friedrich Thon, Cassel, Germany.

2844. Improvements in the treatment of sewage and in deodorising and disinfecting substances resulting therefrom, and other offensive matters. Charlton James Wollaston, Kensington, London.

ABSTRACTS OF SPECIFICATIONS.

4519. Connecting Sewage Pipes with Drains. W. Greenhill.
The service pipe terminates in an oblique mouth, to which self-acting valves are applied, so weighted as to let drainage freely escape and to close immediately after. The drainage is discharged into the open mouth of a siphon trap in communication with the sewer.

4572. Ventilating. R. Harris.
This consists in attaching a supplementary door to the door post or door itself, so hinged that when the door is partly open the supplementary door may be made to close the side opening, leaving only the top open for admission of air. Or doors may be made curved, leaving an opening at the top when closed.

4624. Preserving meat, fish, etc. J. Harvey.
Sulphurous acid gas is used, produced free from impurities by combustion of bisulphide of carbon.

NOTICE.

THE SANITARY RECORD *is published every Friday morning, and may be ordered direct from the Publishers. Annual Subscription, 17s. 4d.; free by post, 19s. 6d.*

Reading Covers to hold 12 numbers of THE SANITARY RECORD *have been prepared, and may be had direct from the Publishers or through any Bookseller, price 3s.*

Original Papers.

ON THE WATER-SUPPLY OF SEASIDE WATERING-PLACES.

BY G. W. WIGNER, F.C.S.

(*Continued from p.* 168.)

IN my last paper I referred to the HASTINGS and ST. LEONARDS supplies. Since that paper was written I have received two more samples from Mr. Andrews, the surveyor, which were drawn from the mains on September 11. The previous sample from Hastings was drawn on July 2, and the previous sample from St. Leonards on August 13. My object in taking these fresh samples was to see if the variability I previously found was confirmed. The results of the last samples were as follows :

	Hastings. Grains per gallon.	St. Leonards. Grains per gallon.
Total solid matter	26·25	15·75
Loss on ignition after deducting combined carbonic acid	6·78	6·03
Lead and copper	none	none
Iron	traces	heavy trace
Chlorine, calculated as chloride of sodium	8·31	5·01
Hardness before boiling, Hastings, 8·5°; St. Leonards, 4·5° (Clark's scale)		
Hardness after boiling, Hastings, 4·7°; St. Leonards, 3·9° (Clark's scale)		
Nitrogen as ammonia	0·0014	0·0022
,, albuminoid ammonia	0·0025	0·0033
,, nitrates	0·3450	0·0510
,, nitrites	0·0050	0·0050
Total nitrogen in these four forms	0·3539	0·0615
Oxygen absorbed by organic matter	0·0040	0·0040

These results are very fairly concordant with the results of the previous samples forwarded by the surveyor. The colour of the last samples was pale blue. The smell and taste were satisfactory. In the Hastings water there was less suspended matter than in the previous sample, and in the St. Leonards water much less. The microscopical examination was in both cases quite satisfactory. I incline to the opinion, therefore, that there must have been some abnormal variation on July 28 which changed the character of the water, even though it did not make it class as a bad one.

I may, perhaps, take two more samples at a later time, but I think, on the whole, the water must be a good one.

* * * * *

EASTBOURNE, the next watering-place, has a normal population of about 15,000. The water-supply is said to be derived from green sand-springs, but from the figures of the analysis, it appears much more likely that the water is drawn from the chalk strata. There is a constant supply of nearly 30 gallons per head per day, with two public drinking fountains, and I am also informed an ample supply for flushing. I have obtained two samples, one received from the surveyors on July 25 last, and one drawn by my assistant from the main on July 28 last. The results are as follows :—

	From Main, July 28. Grains per gallon.	From Surveyor, July 25. Grains per gallon.
Total solid matter	28·40	30·90
Loss on ignition after deducting combined carbonic acid	5·02	5·10
Lead and copper—none.		
Iron—traces.		
Chlorine calculated as chloride of sodium	6·38	7·96
Hardness before boiling, from Main, July 28, 15·1°; from Surveyor, July 25, 16·2° (Clark's scale)		
Hardness after boiling, from Main, July 28, 4·0°; from Surveyor, July 25, 4·6° (Clark's scale)		
Nitrogen as ammonia	0·0028	0·0038
,, albuminoid ammonia	0·0023	0·0028
,, nitrates	0·5380	0·3820
,, nitrites	0·0040	0·0060
Total nitrogen in these four forms	0·5471	0·3946
Oxygen absorbed by organic matter	0·0130	0·0110

In both cases the samples had the pale blue colour of pure water with a perfectly satisfactory taste and smell, and they were both entirely free from suspended matter. The microscopical examination was most satisfactory; there were no living organisms or remains of any kinds; the difference between the two samples was not more than could be expected, as the natural variation of such a water. The whole of the figures of the analysis closely resemble those of the Ramsgate and Westgate waters, and the water-supply has, like the water-supply of those places, the advantage of great organic purity, although it has the disadvantage of a greater hardness than the chalk waters of Dover and Folkestone.

BRIGHTON, according to my information, has a population of about 130,000, and on account of its close proximity to the metropolis, it has probably a larger number of visitors than any other place on the coast. It is supplied with water by a company who pump from chalk springs, and give only an intermittent supply to the town; the water is not filtered. My sample was drawn from the mains on July 28 last, and the results are as follows :—

	Grains per gallon.
Total solid matter	21·40
Loss on ignition after deducting combined carbonic acid	1·86
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	3·86
Hardness before boiling, 12·6° (Clark's scale)	
,, after boiling, 3·2° ,, ,,	
Nitrogen as ammonia	0·0018
,, albuminoid ammonia	0·0015
,, nitrates	0·1760
,, nitrites	0·0050
Total nitrogen in these four forms	0·1843
Oxygen absorbed by organic matter	0·0120

The colour, taste, and smell of the water were perfectly satisfactory. As drawn it was entirely free from suspended matter, but after a few days some slight traces of chalk separated. The microscopical examination was as satisfactory as it could be. This water is, taking all the facts into consideration, better than any water I have reported on in these papers, unless it be that of Dover, but even then I think I should give this water the preference. The albuminoid ammonia is very low, and the

nitrates are also low, and the hardness moderately so. It is very satisfactory to find the water-supply of 'London-super-Mare' so good.

As I wished to ascertain if this was the ordinary character of the water, I had another sample, which was drawn from the main by the surveyor on September 12, *i.e.*, nearly six weeks later than the previous one. The following were the results :—

	Grains per gallon.
Total solid matter	20·80
Loss on ignition after deducting combined carbonic acid	1·54
Lead and copper—none.	
Iron—very slight trace.	
Chlorine, calculated as chloride of sodium	3·63
Hardness before boiling, 12·3° (Clark's scale)	
,, after boiling, 3·5° ,, ,,	
Nitrogen as ammonia	0·0023
,, albuminoid ammonia	0·0028
,, nitrates	0·1120
,, nitrites	traces
Total nitrogen in these four forms	0·1171
Oxygen absorbed by organic matter	trace

This sample also had the proper pale blue colour. It was all but free from suspended matter, and satisfactory in other respects. These results therefore confirm the previous ones, and show that Brighton is well supplied with water.

SHOREHAM, a few miles further west of Brighton, is at present only a small place with a population of some 4,000. The water-supply is derived from springs in the South Down chalk hills, and there is a constant supply in which I am informed the Kingston and Southwick Districts are included. My sample was drawn from the mains on July 28, and another sample was received from the surveyor on August 14 last. The results are as follows :—

	Mains, July 28. Grains per gallon.	Surveyor, August 14. Grains per gallon.
Total solid matter	18·30	20·10
Loss on ignition after deducting combined carbonic acid	3·09	3·68
Lead and copper	none	none
Iron	traces	heavy
Chlorine calculated as chloride of sodium	3·63	3·51
Hardness before boiling, Mains, July 28, 12·6°; Surveyor, August 14, 12·3° (Clark's scale)		
Hardness after boiling, Mains, July 28, 2·8°; Surveyor, August 14, 2·7° (Clark's scale)		
Nitrogen as ammonia	0·0033	0·0030
,, albuminoid ammonia	0·0064	0·0050
,, nitrates	0·0800	0·0560
,, nitrites	0·0040	0·0030
Total nitrogen in these four forms	0·0917	0·0670
Oxygen absorbed by organic matter	0·0160	0·0160

The colour of my own sample was good, and the water was free from suspended matter. The sample received from the surveyor contained a considerable quantity of sedimentary matter, consisting of iron which had apparently been drawn from the pipes, and gave a slight tint to the water. Both samples were free from objectionable smell or taste when heated, and the microscopical results were fully satisfactory.

Here, then, we have another supply, this time constant, of a perfectly satisfactory character, and in fact nearly on a par with the Brighton water. It yields more albuminoid ammonia than the Brighton water does, but contains less nitrogen in the form of nitrates. There is little to choose between them.

WORTHING, a few miles still further west, has a resident population of some 9,000; it is supplied with water from wells about 400 ft. deep, the average quantity being about thirty gallons per head per day. The supply at present is unfortunately only intermittent, but I am informed that before this is in print a constant supply will be started. Dr. Redwood is reported to have analysed the water some two years since, and his results very closely accord with those I have now obtained, while he in his report refers to an analysis by another chemist, which he says is concordant with his own. The water, therefore, is probably uniform in quality. My sample was drawn from the mains on July 28 last, and gave the following results :—

	Grains per gallon.
Total solid matter	26·90
Loss on ignition after deducting combined carbonic acid	1·59
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	5·03
Hardness before boiling, 16·0° (Clark's scale)	
,, after boiling, 3·2° ,, ,,	
Nitrogen as ammonia	0·0020
,, albuminoid ammonia	0·0018
,, nitrates	0·4060
,, nitrites	0·0010
Total nitrogen in these four forms	0·4108
Oxygen absorbed by organic matter	0·0100

The colour was good, there was no suspended matter, but traces of chalk separated after a few days. The taste and smell were good, and the microscopical appearance perfectly satisfactory. The chemical results are similar to those of the Eastbourne samples. The Worthing water is therefore very good.

LITTLEHAMPTON is a small place, with a population of little more than 3,000; it has at present no waterworks, but the inhabitants are entirely supplied from private wells, and, as is unfortunately too often the case, one well generally supplies three or four houses. I obtained a sample from each of two different wells as specimens of the supply, and the following are the results :—

	F. Well. Grains per gallon.	B. Well. Grains per gallon.
Total solid matter	79·80	112·00
Loss on ignition after deducting combined carbonic acid	11·60	17·38
Lead and copper—none.		
Iron—none.		
Chlorine calculated as chloride of sodium	14·63	56·95
Hardness before boiling, F. Well, 38·0°; B. Well, 22·5° (Clark's scale)		
Hardness after boiling, F. Well, 21·5°; B. Well, 12·0° (Clark's scale)		
Nitrogen as ammonia	0·0063	0·0041
,, albuminoid ammonia	0·0141	0·0048
,, nitrates	3·4300	0·9700
,, nitrites	0·0020	0·0010
Total nitrogen in these four forms	3·4524	0·9799
Oxygen absorbed by organic matter	0·0300	0·0600

The sample from F. well was fairly free from smell, and from the figures of the analysis it appears

probable that oxidation had gone on too long for any smell to be left. The residue left on evaporation was quite deliquescent; it was therefore difficult to examine it as thoroughly as would have been desirable, but the microscopical appearance of it was, as far as could be ascertained, extremely unsatisfactory. The taste was offensive.

The sample from B. well had a dirty yellow-green colour, with a most offensive saline taste, as might have been expected from the large amount of salt present and the excessive proportion of loss on ignition. It was full of suspended matter, and the results of the microscopical examination showed that there were present not only living organisms of various kinds in abundance, but pieces of skin and muscular fibre, and indeed an excessive proportion of organic remains of every kind.

It would, therefore, be difficult to find two waters more thoroughly contaminated than these; it would be far more appropriate to call them sewage than water, and if these wells are in any respect, as I think they are, a fair specimen of the wells at Littlehampton, I should advise the authorities to amend the matter by at once taking steps to procure a proper water-supply, and as soon as they have obtained it to close these pumps. Until this is done I should certainly advise all intending visitors to Littlehampton to go elsewhere. If the authorities do not take the matter up themselves the Local Government Board should be called upon to interfere.

BOGNOR, the next town round the coast, is another small place, having a population of rather less than 3,000. It is said that some time ago a water company was formed here, and that they sunk a well with which they intended to supply the town, but the water—I suppose my informant meant the drainage—soaked in and spoiled the well. At any rate whether the water company was abortive or not, the present state of things is that the town is supplied solely from private wells. Here also I obtained two samples, one from an hotel and one from a private house, and the results were as follows:

	Hotel. Grains per gallon.	House. Grains per gallon.
Total solid matter	65·40	48·00
Loss on ignition after deducting combined carbonic acid	3·40	3·42
Lead and copper—none.		
Iron—traces.		
Chlorine calculated as chloride of sodium	16·38	10·65
Hardness before boiling, Hotel, 36·8°; House, 19·4° (Clark's scale)		
Hardness after boiling, Hotel, 17·7°; House, 9·9° (Clark's scale)		
Nitrogen as ammonia	0·0032	0·0138
,, albuminoid ammonia	0·0025	0·0138
,, nitrates	1·9200	1·3270
,, nitrites	0·0030	0·0030
Total nitrogen in these four forms	1·9287	1·3576
Oxygen absorbed by organic matter	0·0140	0·1900

The sample from the well at the hotel was fairly free from taste and smell, and had no suspended matter, but the microscopical examination showed that despite the low proportion of albuminoid ammonia the water was full of living animalculæ, and contained other organic impurities. The amount of nitrates is also sufficiently high to indicate that there has been drainage contamination to a considerable extent. Although, therefore, it has been fairly well oxidised yet the living organisms present and the high proportion of salt are certainly sufficient to condemn the water. Yet this is the supply of an hotel. The sample from the private house was full of suspended matter, and had a markedly offensive taste and smell, while the microscopical examination showed decomposing muscular fibre and other organic remains, and when these results are considered in connection with the figures of the albuminoid ammonia and nitrates, sewage is the only term which properly expresses the character of such a compound. The authorities at Bognor had better set to work at once, obtain a better supply from some source outside the town, and have these wells closed. They are certainly under as heavy a responsibility in the matter as their neighbours at Littlehampton.

Three small places, CROMER, HYTHE, AND SEAFORD, have been missed from their proper order, and I will refer to them next.

SEAFORD, in Sussex, is a small place, with a population of some 1,500, which I have missed in my personal collection of samples, and I am indebted to Mr. Wynter for a sample drawn from the well of his own house there. There are no public waterworks, and consequently no provision for fire. The analysis of this sample is as follows:—

	Grains per gallon.
Total solid matter	113·05
Loss on ignition after deducting combined carbonic acid	23·60
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	44·93
Hardness before boiling, 23·0° (Clark's scale)	
,, after boiling, 13·0° ,, ,,	
Nitrogen as ammonia	0·0017
,, albuminoid ammonia	0·0033
,, nitrates	2·7070
,, nitrites	0·0040
Total nitrogen in these four forms	2·7160
Oxygen absorbed by organic matter	0·0140

The sample was free from suspended matter, and had a pale blue colour. There was no smell, but the taste when heated was decidedly offensive, resembling salt rain water. The microscopical results were satisfactory, except in the presence, or I might even say prevalence, of crystals of salt.

In some respects this water is very bad. The amount of nitrates is excessive. The volatile organic matter is higher than I have often met with, and the water is excessively saline.

CROMER is a small town on the Norfolk coast. Its population is only some 1,500, and the visitors, who are mainly from the neighbouring places, only average about 1,000. At present it has no public supply, but attempts are being made to give one, and the works and reservoirs are already nearly complete. I am glad it is so, for the samples which Mr. Pigott, of Cromer, has drawn and sent to me show a wretched state of water-supply at present. There are three public wells, and some thirty or more private ones. I have samples from two of the public wells, and the following are the results:—

	Town Pump. Grains per gallon.	Baker's Pump. Grains per gallon.
Total solid matter	146·70	32·10
Loss on ignition after deducting combined carbonic acid	29·62	10·07
Lead and copper—none.		

	Town Pump. Grains per gallon.	Baker's Pump. Grains per gallon.
Iron	slight traces	traces
Chlorine calculated as chloride of sodium	48·91	5·73
Hardness before boiling, Town Pump, 54·4°; Baker's Pump, 13·5° (Clark's scale)		
Hardness after boiling, Town Pump, 40·8°; Baker's Pump, 7·3° (Clark's scale)		
Nitrogen as ammonia	0·0018	0·0036
,, albuminoid ammonia	0·0076	0·0095
,, nitrates	5·9500	1·2600
,, nitrites	traces	traces
Total nitrogen in these four forms	5·9594	1·2731
Oxygen absorbed by organic matter	0·0720	0·1040

These waters are both, to say the least, interesting specimens. They would be more interesting if I could forget that the health of some hundreds of people is being imperilled by them.

The town pump water is of a yellow-green colour with very offensive smell, and a nauseous taste of salt and nitrate of soda. It swarmed with animalculæ—no other word will express its state—while the residue showed crystals of urea, as well as alkaline urates. This so-called water is concentrated but fairly oxidised sewage.

Baker's pump water is a little better, but still bad. It is full of animalculæ, has a dirty colour, offensive smell, and putrid taste. The nitrates are lower, but still sewage is the only name by which it can be called. Mr. Pigott sent me one sample as a specimen of a private well at Cromer. The following are the results:

	Grains per gallon.
Total solid matter	39·80
Loss on ignition after deducting combined carbonic acid	3·20
Lead and copper—none.	
Iron—very slight trace.	
Chlorine calculated as chloride of sodium	6·90
Hardness before boiling, 19·9° (Clark's scale)	
,, after boiling, 9·0° ,, ,,	
Nitrogen as ammonia	0·0016
,, albuminoid ammonia	0·0055
,, nitrates	1·6100
,, nitrites	traces
Total nitrogen in these four forms	1·6171
Oxygen absorbed by organic matter	0·0700

The colour was dirty green and the smell offensive, while the taste was nauseous in the extreme. Perhaps, on the whole, it is better than the public pumps, but it is bad in any case.

Cromer clearly is in sore straits till the waterworks are completed, but the inhabitants deserve every credit for pushing them forward as they are.

HYTHE also has been missed from its proper place. It is a small place on the Kentish coast. Population about 3,500 (and not very many visitors). It has a constant water-supply of some 20 gallons per head per day, derived partly from springs and partly from wells, and the supply is always available for fire. I am indebted to Mr. J. V. Cobb for my sample, the results of which are as follows:

	Grains per gallon.
Total solid matter	35·40
Loss on ignition after deducting combined carbonic acid	8·55
Lead and copper—none.	
Iron—very slight trace.	
Chlorine calculated as chloride of sodium	4·80
Hardness before boiling, 17·7° (Clark's scale)	
Hardness after boiling, 4·4° (Clark's scale)	
Nitrogen as ammonia	0·0009
,, albuminoid ammonia	0·0030
,, nitrates	0·2340
,, nitrites	0·0040
Total nitrogen in these four forms	0·2419
Oxygen absorbed by organic matter—traces.	

The sample had a pale blue colour, and was free from suspended matter. The microscopical results were quite satisfactory. The only objectionable feature was a slightly unpleasant taste. On the whole it is a good water.

In my next paper I shall report on the Newhaven supply, and then summarise the results of the thirty-four places from which I have already obtained samples, and as far as possible sort them in order of merit. In consequence of the lateness of the season, I shall then report on the Yorkshire, Lancashire, and Welsh coasts, before passing to Devon, Cornwall, Hampshire, and the Isle of Wight, and if space permits I shall commence Yorkshire next week, after the summary.

SEWER GAS.*

BY R. BARNES AUSTIN, C.E.

I AM about to say a few words on that arch enemy of the human race—sewer gas. As I proceed I will endeavour to illustrate my remarks by some simple mechanical experiments, and I hope I shall be able to convince you that by the exercise practically of a little care and common scientific sense the presence of sewer gas and its concomitant evils within any house may be prevented. In the first place, I would remark that 'sewer gas,' as the SANITARY RECORD of July 27 well says, is a popular rather than a scientific term, and is not one definite gas, but several. Indeed, there is hardly a gas known to chemists that may not be found in sewer gas at one time or the other. Nor is this complexity of composition at all to be wondered at when we consider the complex character of sewage itself. In sewage may be found in one form or other almost every known chemical element, not even excluding the precious metals themselves. Another point worthy of note is that, speaking from a strictly chemical standpoint, not one nor all the known gases which singly or unitedly go under the name of sewer gas would ever produce any specific disease, such as small-pox, scarlet fever, diphtheria, etc. In some of our manufacturing districts whole towns have been built on foundations consisting of chemical refuse and waste products, which foundations keep generating sulphuretted hydrogen and hosts of other gases, partially present in sewer gas, and yet while their unpleasantness is admitted, the specific action of each in producing the destructive power of sewer gas is nil. Again, speaking from a strictly chemical stand-point, it may with certainty be said that while undoubtedly certain chemical compounds possess strong life-destroying powers, are in short, poisons, no pure chemical product

* Read at the meeting of the National Association of Sanitary Surveyors and Inspectors at Northampton, August, 1877.

known possesses the property of even blood-poisoning, much less of producing any specific disease. But sewer gas does possess in a most material degree the power or property of producing, or it may be of feeding or developing, that class of disease which is now known as zymotic, and by some as filth disease. The fact is that sewer gas is a chemical compound or series of compounds plus something else. This something else, whatever it may be, is the something which does all the mischief. As to its nature, I have no time, had I the ability, to discuss it on this occasion; suffice it to say that the majority of investigators look upon it as a low form of life, akin to the zyme of yeast in its action, and exceedingly capable of reproduction and development in a favourable soil. Moisture is also thought to be essential to its life and development.

At all events it is a product or a concomitant of the chemical decomposition of filth of all kinds, and especially of that class of filth consisting of human or animal excreta. The gases, etc., are the vehicles in which these respective particles float or are carried about. In all probability we shall discover that certain combinations of decomposing filth produce certain forms or species of infective particles, and that these, in turn, produce certain definite diseases, each after their own kind. But however interesting these investigations or theories may be, I must now put them aside, and accepting the universally acknowledged fact that when a human being comes in contact with sewer-gas the health of that person is in danger, I will at once proceed to show how effectually to guard against this danger. Sewer-gas is more dangerous in dwellings than out of them. In houses we have it in a concentrated form. Out of doors it is necessarily diluted, and according to the amount of dilution the danger is diminished; on this point I must just digress for a few minutes. It is held by some exceedingly clever investigators, Professor Wanklyn, for instance, that there is a point of dilution at which all danger ceases. If he and his school are right, I would rather act in the belief that, though the chances of meeting the enemy may be lessened, yet the chance—that is, the danger—remains, and if encountered, no dilution will avail. The enemy is there; and if accidentally met in the road, it will avail nothing that a thousand and one other roads are free and safe. With the increase of domestic comforts and conveniences the dangers to health from sewer gas have increased *pari passu*, and your practical experiences as surveyors and sanitary inspectors will bear me out in asserting that, as a rule, the mansion is in greater danger from sewer gas than the cottage, and that the greater the mansion the greater the danger.

With regard to sewage, out of sight, out of mind, has been too much the rule. So long as, by the mere lifting a handle, the disagreeable but necessary product of eating and drinking have been removed from sight, we have been satisfied, forgetful altogether of any secondary consequences. What necessarily follows, inevitable decomposition, has been quite overlooked, and all the plainest and simplest laws of pneumatics and hydrostatics ignored. We have turned the solids out of doors (not always quite that), and, being out of sight, have failed to realise the fact that each time we have done so we have taken their predecessors back again into our dwelling in a ten times more insidious and harmful form. We have been sending solids out and taking them back as gases, to be breathed and lived upon. We must have drains—we must also take water-closets as accepted facts, and such being the case, what is now required is to combine safety with convenience and even luxury. Can this be done? I answer emphatically yes! and I know you will forgive my saying that it can best be done by aid of the system and appliances I have the honour to-day of calling your attention to. I need not tell you skilled gentlemen that as drains are generally constructed the house must be the receptacle of much of the sewer gas generated in them. I need not point out how the water-closet is one entrance, the housemaid slop pipe another, and the kitchen and scullery sinks others. In short that every entrance to a drain or to a sewer is also an exit for sewer gas accelerated by the natural suction of the rarefied atmosphere of the house and its rooms.

Attempts, legion in number, have been made to combat these evils by trapping, but in nine cases out of ten the remedy has been worse than the disease, and in the tenth case useless. The traps themselves have been ineffectual, as well as from their very nature cesspools or gas generators. The mischief caused by imperfect trapping has far exceeded that caused by sewer gas itself. It has been as though trap-makers thought that safety consisted in complication; at last the tyranny, so to speak, of the trappists proved too strong for further endurance, and a dead set was made at all but the simplest of traps. One set of reformers certainly effected an improvement in diminishing the number of traps and removing them to the outside of the house, this certainly was a slight improvement, but only a slight one, and the form of traps used by these gentlemen was peculiarly liable, on the slightest provocation, to be untrapped. This school of reformers endeavoured to break the pressure by carrying the drain pipes to the roof, and some way or other convinced themselves that by so doing they ventilated the drains. A little consideration will convince you that this is not to be depended upon, even when you have both an upcast and a downcast pipe, as the air or gas remains in these pipes and merely balances itself, as I will show you. It remained for Mr. Banner to design and complete the true and only perfect system. After many experiments and much thought, Mr. Banner at last hit upon a plan so simple and so effectual, that the wonder now is that it was not discovered and applied long ago, and already we have many would-be imitators. Following natural laws, Mr. Banner found that you cannot empty a drain or pipe, but must fill it with something else. To create a vacuum in a drain or pipe in constant use was simply an impossibility. So Mr. Banner emptied his drain of sewage gas, and refilled it immediately and simultaneously with something else, that something else being fresh external air. In other words, we withdraw the sewer gas from the house drain and soil-pipe, and never afterwards allow it to become sewer gas, by constantly replacing the air within all the pipes with fresh external air, not at intervals only, or in any uncertain fashion, but constantly and effectually. To do this, a thing very many had tried at, Mr. Banner found that merely pulling away and drawing at the top of a closed pipe was of no avail whatever, and in that knowledge and the means of overcoming it lies at once the simplicity and yet the very pith and essence of his invention, namely, the inlet and cowl.

The cowl really and constantly creates an ex-

haust, and it is admitted to be at once the most simple yet most powerful ventilator extant, and we claim for it that it acts with perfect effect during all the varying influences of wind and weather, as is so unmistakably demonstrated by the model before me.

As to the traps, they are the only two forms which are traps and yet not cesspools.

One great economy in using the Banner system I have not yet mentioned; by its adoption only one trap is necessary, and all others are at once abolished, and with them all the dangers inseparable from their use.

As far as the traps under closets are concerned, it seems almost as though human ingenuity had been perverted to manufacture evils, for as closets ordinarily exist they cannot be otherwise than impure and, consequently, dangerous; and I believe I am quite within the fact when I assert that those filth receptacles so generally put below water closets have been the unknown and unsuspected cause of the ill-health of thousands. By adopting the Banner system, at a less expense than any of the existing systems, perfect immunity from sewer-gas is ensured. Fresh external air is always being drawn in at the inlet and along the drain-soil and other pipes while the trapping is perfect, yet so simple that it can be inspected by anyone. I do not wish to be combative, but I must assert that no system is so simple and yet so perfect as the Banner system.

With the Banner combination of cowl-trap and inlet, sewer-gas and its concomitant evils may be defied. Nothing short of this combination will prove really effective and safe. Other half-way measures are mere palliations, and liable at any moment to a break-down. To revert again to the SANITARY RECORD of July 27, 'The strength of the whole is the strength of the weakest part.' We have no weak part; each part is calculated to effect treble the work it will ever be called upon to perform.

THE

SANITARY RECORD.

FRIDAY, SEPTEMBER 21, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

SEPARATE WATER-SUPPLY FOR LONDON.

ONCE more the question of how best to supply the metropolis with water is before the public, and this time an elaborate and carefully thought-out scheme has been published by its authors, Messrs. Easton and Bramwell. These gentlemen propose to introduce a supplementary supply from the chalk, and pump it up into four large reservoirs, so as to have an ample provision for storage and distribution, and this water is to be supplied in separate mains to the houses and streets, and used for potable uses and for fire-extinguishing purposes only. The scheme has met with almost universal favour, and is especially commendable inasmuch as it does not necessarily require the purchase of the Water Companies by the Metropolitan Board. On the contrary, London and its immediate suburbs could be supplied with pure water for the above services, and still all would work perfectly well with the monopolies now existent. The water at present supplied from the various companies, or as much of it as is necessary —particularly that derived from the river, and the filter beds—would continue to be used for washing and manufacturing purposes.

There have been from time to time, many colossal schemes devised for the supply of London with pure water, and the favourite hitherto has been the one which projected the bringing of this element from the Welsh lakes. The success of the Glasgow experiments was the largest factor in the satisfaction which was exhibited by the promoters of the idea, and as we all know, the city of Manchester has approved of a similar plan for their supply in place of the present faulty and insufficient one. No doubt the great drawback to the realisation of the design is the enormous cost which it would entail—since no one can hesitate about the possibility of bringing the water so far. It would be but a step beyond the Glasgow achievement. The objection that the pressure would be insufficient to suit every purpose of the metropolis, and that the water would still require to be pumped up into reservoirs, is a more serious one. Another objection raised against the appropriation of the lake waters was the desecration of Nature's haunts, the noise, the machinery, and the population which would perforce follow the innovation, but though this was strongly argued, it did not apparently win many supporters. By far the most serious objection—after that of expense—was that raised by the Duke of Richmond's Commission which stated that 'no town or district should be allowed to appropriate a source of supply which naturally and geographically belonged to a town or district nearer to such source, unless under special circumstances.' The general reply in the minds of utilitarians to this was—supply then all the towns and districts on the way with the same water as much as possible, and thus out of an apparent evil extract a positive benefit.

It is conceded on all sides that the bulk of the water supplied to the metropolis is unfitted for drinking uses. Since 1829, when the first filter-bed, one acre in extent, was built by the Chelsea company, the area of these beds has been multiplied some seventy-seven times, and still there are 'moving organisms,' 'turbidity,' and general impurity visible in the supply rendered by some of the companies. It is possible that a more complete system of filtering would cleanse the water from all

objectionable matters, and Professor Wanklyn has shown how this can be attained; but the cost would necessarily be great, and possibly quite out of the question. It could only be by almost superhuman efforts that the whole of the intakes could be regularly purified from the solid matters in suspension, and the filtering arrangements made at all times ready to meet the sudden access of dirtiness which occasionally occurs after storms. And just as the belief that water running for a few miles undergoes a rapid and thorough purification—or at least one which destroys all really noxious matters—has failed us, so possibly the river waters would prove too unclean to be compatible with a filtration on a larger basis than a laboratory one, and the end prove as bad as the beginning.

There is one thing incontestably true, and that is—the water derived from the chalk requires proper softening. Fortunately this presents no difficulty which cannot be overcome. In our issue of August 19 of last year we explained in detail how the 2,000,000 gallons of water regularly derived from the chalk on Bushey Heath was softened on the Clark process, and we could not have been more explicit on the subject. There is a possibility that the process may be somewhat cheapened by the use of the Porter-Clark system, but it would not be safe to calculate upon this until the Banstead experiments have been tried upon a much larger scale. This latter system appears remarkably well adapted for the removal from the Thames water of the carbonate of lime which is there present, and it is possible that the same process is equally well suited for that mechanical purification of the river water which consists in the interception of organic and other deleterious matter. Mr. Porter considers that it would be impossible for living organisms to disinter themselves from the aggregation of the minute atoms of chalk which result from his filtration. But, again, if it be true that the purifying action by the softening process 'depends largely upon some physical condition of the organic matter,' it is doubtful, according to Mr. Bischof, whether the infinitesimal living bodies, which prove so dangerous to health, can be eliminated in this way.

The question naturally arises, 'Will the chalk formation continue to yield the large amount of water expected from it?' Various opinions are held upon this point. The Rivers' Pollution Commissioners reported in 1874, 'There is reason to believe that the more this stratum is drawn upon for its abundant and excellent water the better will its qualities as a storage medium become.' Others allude to the fact that many chalk wells, which a few years ago yielded good supplies, 'only furnish a fraction of what they did,' and instance the deepening of the well at the Post Office, the Trafalgar Square well, and many others, especially on the north side of the Thames. It is further averred that wells must now be sunk some 450 feet in depth, in order to produce 25,000 gallons daily, and that only in cases where the well is sunk down to some underground reservoir in the chalk, or to the bottom of a chalk valley, where a stream is constantly flowing, that a continuous and ample supply can be obtained. No amount of pumping will 'materially increase the proportion of the rainfall which percolates through the soil' to the underground reservoirs. This last statement is entirely opposed to that of the commissioners, just quoted, and is, apparently, the more sensible of the two, inasmuch as the water cannot possibly percolate through the soil from rainfalls, or find its way into the pumped-out cavities through the chalk from the rivers and streams as fast as it can be drawn for metropolitan uses. Again, doubts are thrown out as to whether the water pumped up in some parts of London is derived from the chalk at all, but rather from the upper greensand formation.

It appears to us that on the north side of the Thames there is a decided decrease of water derivable from the chalk, and that the sinking of deeper wells and the making of costly adits would not only prove far too expensive, but would drain many of the present wells now in use. The more feasible scheme would be to make use of the wells now in vogue by the Kent Company and the New River Company, which now supply some eighteen millions of gallons daily. The wells of the first-named company can, themselves, according to Messrs. Easton and Bramwell, supply over sixteen millions of gallons per diem. At Gray's, it is said that six millions of gallons have been pumped day and night into the Thames, 'without, by any means, developing the whole of these well-known springs.' There is, apparently, no practical limit to the supply of this pure water from the chalk at these places, and this being so the scheme lately propounded is simple of realisation.

In the Bramwell-Easton, or, as we should perhaps say in the Bazalgette-Bramwell-Easton scheme, now before us all, there is one great novelty, and that is, the idea of a separate supply for fire extinguishing purposes. The authors are entitled to all praise for so satisfactory a working out of the problem of a supply which should be a separate one, a cheap one, and one based on the soundest calculations. Everybody hitherto, as they say, 'had been deterred from putting forward the apparently extravagant proposition that the best water should be used for fire extinguishing, as it appeared to be an unwarrantable waste of the good water; but on investigation, it turns out that even now in the course of a year, the total quantity of water required for fires is so small that one can well afford to use the very best for the purpose.' When the proposed plan is in operation 'the quantity of water required for the extinguishing of fires will rapidly decrease, for it cannot be doubted that on the establishment throughout the metropolis of an effective hydrant service, a fire will rarely be

suffered to develop into a serious one.' Another thing in favour of the present scheme is the possibility that after all a pure supply of softened water from the chalk may prove partly unfitted for manufacturing purposes. According to a French chemist, M. Gérardin, the pure water of artesian and deep wells is much inferior in industrial value to the river water which has been impregnated in the regular way with a certain amount of organic matter. The scheme lately set forth will, at all events, permit of our manufacturers making use of our river water, and thus perhaps all parties will be satisfied and benefited.

We must perforce let the matter stand for the present. Without doubt it will all be carefully argued out in Parliament, and the most promising plan adopted. We confess a leaning towards a supply derived from distant lakes, and we believe that an ample volume of the purest water can be thus obtained—at least there are no insuperable objections. It may be advisable, however, first of all, to try the present scheme, and note its working, and should it fail, and the prognostications of its 'unfriends' be realised, it would be easy to revert to the other plan, and thus imitate the ancients on a gigantic scale. The money expended would no doubt be lost, like the ammonia said to be robbed from the universe by the discharges of gunpowder; but the separate mains would still be extant, to be used for other purposes, perhaps, who knows, for the conveyance of sea-water to our habitations.

Notes of the Week.

GRATUITOUS instruction in swimming is now given at the City of London Baths, Barbican, and at two of the best baths in the West End of London.

THE cost of carrying out a scheme for supplying Sydney, New South Wales, with water according to the suggestions of Mr. William Clarke, will be 1,250,000*l.*

THE Ilkeston local board have entered in an agreement with the local gas company to purchase their works for 25,000*l.*, and a sum not exceeding 500*l.* for legal and other expenses connected with the transaction.

THE epidemic now prevalent at Nether Hoyland is one of scarlet fever and not of typhoid, as has been stated in many journals. There have been twenty-three deaths from scarlet fever since May 1 in a population of 7,000.

THE Hamlets of Scholes and Oakenshaw have, by provisional order of the Local Government Board, been added to the Cleckheaton local government district, the board for which is in future to consist of thirteen members instead of nine.

DR. FRANKLAND reports that the Lambeth Company's water was supplied in a slightly turbid condition last month. He draws attention to the exceedingly abundant supply of water yielded by the wells sunk into the chalk outside the London clay, as compared with those sunk through the clay within London, which yield an entirely different, though excellent, water.

A CAFÉ company has been formed at Sheffield, with a capital of 20,000*l.* in 1*l.* shares. At a meeting held last week directors were appointed, and it was decided to commence business when three thousand shares were taken up. Over two thousand have already been subscribed.

A VERY favourable report of the health of Lower Brixham has been presented to the local board of that place by their medical officer of health. Improved drainage and a constant supply of pure water seem to be bearing good fruit.

A SCHEME for the drainage of Saltash has been prepared by a committee of the St. Germans Board of Guardians, who are the sanitary authority, assisted by the mayor and the surveyor. To carry it out a loan of 1,500*l.* has been applied for, but it is understood that only some 700*l.* or 800*l.* of this will be drawn.

FINANCIALLY the results of lighting the street lamps of the town of Barking with paraffin oil in lieu of gas have just been published, and the local authorities claim an immense saving for the new system. The contract of the gas company for lighting the streets for the one year was 380*l.*, while the expenditure for twelve months under the new plan was 275*l.* 17*s.* 9*d.*

AN attempt is to be made to convert Sheffield parish churchyard, which occupies about three acres in the heart of the town, into an ornamental garden. An agreement has been confirmed by the corporation by which a portion of the churchyard is to be given up on two sides to widen the streets, and the remainder is to be enclosed, laid out as an ornamental ground, and kept in good order for ever at the expense of the town.

LAST week an extraordinary explosion took place in Feachers Street, Liverpool, in a sewer, followed by the bursting of the pavement, and the issuing forth of flame. Such was the force of the explosion, that a large stone, weighing over 4 cwt., was hurled upwards. The flames raged in the sewer for some time, and it was ultimately discovered that the explosion was caused by an accumulation of gas from a fractured main gas pipe, the ignition being caused by a passer-by throwing a lighted match down the sewer grid.

INTELLIGENCE has been received at Cambridge of the death of Mr. Richard Apjohn, of Caius College, Cambridge, and public analyst for the town and county. The deceased gentleman left Cambridge a few days ago upon a bycicle, intending to travel upon the machine to London. Having nearly arrived at his destination, he had, it is supposed, a fall, and received such injuries as to render necessary his immediate removal to the Midland Hotel, where he died on Tuesday. He was well known for his skill in chemistry, and held office in the University. He came from Dublin to Cambridge. His death has caused vacancies in several offices.

WINDOW CLEANING.

THE *Building News* describes a new and simple apparatus for facilitating the cleansing of both sides of a window from the inside of an apartment which has been devised by a resident in Perth, and a sample of which has just been fitted up in the office of Messrs. Cruikshank and Fulton, consulting engineers, Glasgow. A portion of the rod at one side of the window is made removable, and the suspending cord at the same side is capable of detachment. At the other side of the window hinges are provided for each sash, on which they are swung inwards. In opening the window the movable portion of the rods are taken out. The sashes are alternately raised and lowered in the usual way into gear with their hinges, and, the suspending cords having been detached, the sashes are easily turned on their hinges inwards, and a person standing inside can comfortably reach the different panes.

THE HEALTH OF SCARBOROUGH.

REPORTS having been circulated that typhoid fever is prevalent at this favourite watering-place, we are glad to be able to contradict the rumour in the most positive manner. One death was reported from typhoid fever in the lower part of the town about three weeks ago; but upon investigation, it was very doubtful that it was really a true case of enteric fever, since the patient had been delicate many months, and died at the last after only six days' illness. This is the only death from typhoid fever during the present quarter, and the medical officer of health, Dr. Taylor, is not aware of the existence even of a single other case of the disease.

IMPROVED (?) DWELLINGS.

THERE must surely be something considerably wrong in the supervision exercised by the board of the 'Improved Industrial Dwellings Company' if the complaint which has been made to a contemporary is based upon facts. A 'working-man' wrote to say that although he pays 8*s.* 6*d.* per week for three rooms and a scullery, one of the bedrooms is so small that he could not get an ordinary bedstead into it, and in the other bedroom in some parts one can stand and touch the opposite wall, it is so small. The scullery is so cramped that two persons cannot pass each other; and when his wife is washing she must put the fire out and put her washing apparatus where the fender ought to be—otherwise the door cannot be opened. The waste-water from the sink flushes the water-closet through a pipe which has neither trap nor bend, the consequence being that when the lid is on the water-closet the place is filled by a horrid stench.

We wonder if there was an architect for this structure, or if so, what the clerk of works was doing to pass such sink arrangements as the above.

THE REGISTRATION OF INFECTIOUS DISEASE.

DR. COLLIER, the medical officer of health to the Fulham district board of works, having recently reported that there had been an extensive outbreak of small-pox and several deaths at Rectory-place, Walham Green, in consequence of the first case not having been reported to him till a fortnight after it appeared, the Fulham district board of works, at their meeting held on Wednesday, resolved 'to put themselves in communication with the Home Secretary with a view to the Government providing in the proposed new Public Health bill a clause making it compulsory upon medical men to give notice to local authorities of the occurrence of cases of infectious or contagious diseases.' Mr. Brown, in seconding the resolution, observed that it hardly went far enough, as other persons besides medical men should be compelled to give the information. We are glad to say that the necessity for an enactment of this kind, which has been so constantly advocated in our columns, seems to be daily more appreciated by medical officers of health and sanitary authorities.

OUTBREAK OF TYPHOID FEVER IN EDINBURGH.

ANOTHER epidemic of typhoid fever caused by an infected milk supply must be added to the already long list. It seems that about three weeks ago the medical officer of health of Edinburgh was informed of a serious outbreak of typhoid fever at Coltbridge and other districts in the west end of the city, which, it was believed, had been caused by means of milk sold at a dairy in which was a person suffering from the fever. The district where the outbreak first occurred is without the municipal boundaries; but steps were at once taken, and the dairy patient was removed to the infirmary. Over twenty families in the district were suffering from the fever when the outbreak was first noticed, and a number of additional cases have occurred since. Several of the cases have been attended with a fatal result. It is stated that the retailers of milk who were supplied by the dairy referred to, and by another in the same district, in which the sanitary arrangements were found very defective, have been advised by Dr. Littlejohn to discontinue their supply for the present, and that this advice is to be acted upon. The dairies themselves have undergone a thorough sanitary investigation.

POLLUTION OF RIVERS.

THE Manchester Sanitary Association reports tersely and to the point upon the recent Pollution of Rivers Act. The committee regret that the bill which was passed is a very insufficient measure, and its requirements are so modified by provisos, that it can scarcely be said to be any improvement on its predecessor. Thus the section relating to solid matter merely condemns pollution by 'solid refuse, rubbish, cinders, or putrid solid matter.' Any article which may be shown to have some commercial value which, however, might be insufficient to pay for removal, would not be deemed a polluting article, and solid particles suspended in water are not objected to. Again, the section relating to sewage protects the offender against proceedings under the Act, if he has used the 'best practicable and available means' for rendering the liquids from his works innoxious; and in all cases the responsible party must be proved to have 'knowingly' committed an offence, before being liable to punishment. Thus the usefulness of the Act is practically nullified. The committee feel, however, that the foundation has been laid for a more efficient measure, and they hope to assist in promoting such improved legislation at the first opportunity.

UNWHOLESOME HOUSES.

AT an inquest lately held by Dr. Thomas on a child aged two-and-a-half years, who had died in Nightingale Street, Lisson Grove, Dr. Rugg, the medical attendant, called attention to the disgraceful condition of the houses in that street, saying that he did not wonder at children wasting and dying in such wretched rooms and dwellings as are to be found there. The condition of the houses is generally very bad, and the sanitary inspectors seemed to be afraid of going into these back streets. A juror said that these places could not be rooted out until there was a house to house sanitary inspection. We scarcely think that Dr. Rugg can be correctly reported in saying that the sanitary inspectors seemed to be afraid of going into these back streets, but by a reference to the reports of the medical officer of health, we suppose the fact to be that there is no regular annual house to house inspection of the houses occupied by the poorer classes, such as obtains in many other metropolitan districts. The number of inspections reported as having been made in this large parish, seems too small for a proper sanitary supervision of all the poorer houses, so that it is to be hoped that the Marylebone Vestry will direct the necessary action to be taken, and if requisite, increase the staff of inspectors, so as to prevent such a statement being publicly made in future.

THE HEALTH OF CAMBRIDGE.

AT the last meeting of the Town and University Improvement Commissioners, Mr. Swann Hurrell (the chairman) drew attention to the satisfactory state of the health of the borough. According to the death-rate of several towns, with a population equal to or exceeding the population of Cambridge, compiled from a return made in May, 1877, at the second annual conference on the 'Health and Sewage of Towns,' published by the Society of Arts, it was satisfactory to find that Cambridge stands in the lowest death-rate. It was desirable that this important fact should be known to the public. Whilst regarding this as satisfactory, however, Mr. Hurrell said he did not think the improvement board ought to relax their efforts. Dr. Anningson, upon being formally reappointed medical officer of health, said he was sorry that the board, from circum-

stances over which it had no control, had not been able to do more for the public health; but the commissioners had taken a deep interest in the welfare of the town, and had always shown an anxiety to carry out anything of importance to the health of the borough so far as circumstances permitted.

PENZANCE AND ITS MEDICAL OFFICER OF HEALTH.

AT a meeting of the Penzance Town Council last week, the Mayor (Mr. Alderman Boase) presiding, the following letter was received from the Mayor, who has for many years past been discharging the duties of medical officer of health of the borough:—

'To the Town Council and Urban Sanitary Authority of Penzance.

'Gentlemen,—I have for many years acted as your medical officer of health, free of charge, with the hope that the time would have long since arisen when one or more Unions might be amalgamated, so that a medical officer should be appointed to give his sole time and ability to the duties, and thus keep him from any professional or local influences. However, in my opinion, the time has come when a paid officer for this town should be appointed, and at the last council meeting I advised you to request the Sanitary Committee to fix a salary for your medical officer. They, in a very kind manner, offered to recommend me as the paid medical officer; but, having for many years (twenty-five years) done my best as an unpaid public man in sanitary and other matters for the welfare of the town, I prefer remaining a free and independent member of the town council. I therefore respectfully resign my position as your medical officer on the 29th of this month, but will continue to hold office until my successor is appointed. I may say neither the unjust remarks in the *Lancet*, nor the jealousy and enmity of a few in this town, have induced me to resign; but my desire is, and has been, to do my best for the public generally. You have thanked me many times for doing my duty independently and to your entire satisfaction. I have saved the ratepayers much, and I may also say mitigated, if not prevented, the spread of disease, assisted by your valuable, energetic, and painstaking inspector, Mr. Whear. Thanking you for all past kindnesses, believe me always yours very faithfully,

'FRANCIS BOASE, Medical Officer.'

The resignation was accepted, and the council tendered unanimously their cordial thanks to Mr. Boase for the very efficient manner in which he had discharged the duties of the office gratuitously for so many years past, and for which services the whole town was greatly indebted to him.—On a report of the Sanitary Committee being read subsequently, it was determined that advertisements should be issued of the council's intention to appoint a medical officer of health.

NON-VENTILATION OF SEWERS.

IT will be in the recollection of our readers that Mr. Ashmead, the Bristol borough engineer and surveyor, stated in the presidential address to the Association of Municipal and Sanitary Engineers in July last, that he was antagonistic to the ventilation of sewers; and by this statement somewhat took many of his professional brethren by surprise. We are now enabled to quote this gentleman more fully, from which we gather, that he is quite alive to the fact that disconnection of the house from the main sewer is beneficial, but that he cannot see why, if one cuts off the connection, one need be at all solicitous about ventilating the sewer. He says, in the discussion which followed the address, that 'unless you want to be continually getting into the main sewers for sundry purposes you do not want to ventilate them. We say we do not open our sewers to examine them or do anything with them. We do not want to go into them, and don't want to ventilate them; we don't know, in fact, that the gas is there at all. In the first place, the sewers are all made of brick; we have no main sewers of pipes excepting a few short lengths. We never flush them; we never have had any occasion to spend a penny for water for flushing purposes in any shape or form; the flow of water is always sufficient. We have in Bristol a good supply of water from the Water Company; and have always found that sufficient for every purpose—the flow is constant and the supply constant. With reference to the velocity of the sewer air, we have never ascertained it, because we have never troubled about it, or any other analyses relative to it—we have made no experiments whatever. Some two or three years ago a question cropped up, and I was requested to make some experiments and ascertain what could be done; but really there was nothing to do, and nothing was done in the matter. As to the question whether after the sewers have been closed the workmen can enter, we have never found any difficulty, if the workmen have to enter, which is very seldom. In some of the old sewers in the old parts of the city we have had gas, but in none of the new sewers; and all we have to do then is to open two of the manholes instead of one; the one ventilates the other, and the men can go in immediately. The waterspouts in no case enter the sewers directly, and consequently they are always trapped; that is to say, they are discharged immediately into the cisterns as a rule. The water-closets are generally outside the houses in the inferior houses, but in the better class of houses we have one closet inside and one outside. The whole of the gullies are trapped, and there is no opening of any description from the sewers that I am aware of. Open sewers would in fact be open ditches, nothing more or less. The great object of sewers is to confine the sewage within a certain area, and not to allow it to be open to everything. There is no doubt that some of the open shafts in the centre of streets become down-cast shafts, and my opinion is that their becoming down-cast shafts must carry the gas into the houses. As to the rush of air at low water into the inlets. I mentioned in my paper one instance only—the high level district of Clifton, where the whole of the sewage is discharged down an incline of one in four. At low water the mouth is exposed, and at times we found a draught; but I constructed an air-valve at the top of that incline, and we have had no trouble about it since, and that is some ten years ago.'

Mr. Ashmead also very frankly told his audience that he could not say that all the houses in Bristol are disconnected, but he says that he in every case insists upon the water-closets, and the privies in private houses, and all the drains, being properly trapped. Of late years he has in many instances had a syphon trap put in between the main sewer and the house, and ventilating pipes from the house carried up, but he has not insisted upon this. It has been done at the expense of the builders, and at the suggestion of the architects or owners, without his interference.

Special Reports.

HEALTH AND SEWAGE OF TOWNS.

REPORT OF THE EXECUTIVE COMMITTEE.

THE Executive Committee report that the Conference applied itself especially this year to the dry systems, as distinguished from the water-carried systems discussed last year, and have passed the following resolutions thereon:

1. That the pail system, under proper regulations for early and frequent removal, is greatly superior to all privies, cesspools, ashpits, and middens, and possesses manifold advantages in regard to health and cleanliness, whilst its results in economy and facility of utilisation often compare favourably with those of water-carried sewage. 2. That hitherto no mode of utilising the excreta has been brought into operation which repays the cost of collection. 3. That the almost universal practice of mixing ashes with the pail

products, though it applies these as a convenient absorbent, and possibly to some extent as a deodorant, is injurious to the value of the excreta as manure. 4. That, for use within the house, no system has been found in practice to take the place of the water-closet. 5. That, although there are appliances and arrangements by means of which the sewer-gases may be effectually prevented from entering houses, they still do so in the great majority of dwellings, both in town and country, including the metropolis. 6. That it is of the highest importance, in a sanitary point of view, that the metropolitan and local authorities should exercise great vigilance with respect to this matter, and that it should be made by law the duties of these bodies to enforce efficient measures for the exclusion of sewer-gases from dwellings, and to watch over their being efficiently carried out under such a system of payment as shall not press too heavily on those at whose charge the work is done. 7. That in every large town plans of its drainage should be deposited with the local authorities, and be accessible to the public. 8. That all middens, privies, and cesspools in towns should be abolished by law, due regard in point of time being had to the condition of each locality. 9. That the annual accounts of the sanitary authorities, especially in great towns, should be prepared and published in sufficient detail.

(Signed by)

THE RIGHT HON. JAMES STANSFELD, M.P.,
Chairman of the Conference.
LORD ALFRED CHURCHILL.
SIR H. COLE, K.C.B.
LIEUT.-COL. SIR E. F. DU CANE, R.E., K.C.B.
F. A. ABEL, F.R.S.
GENERAL F. C. COTTON, R.E., C.S.I.
CAPT. DOUGLAS GALTON, R.E., C.B., F.R.S.

THE ARTISANS', LABOURERS', AND GENERAL DWELLINGS COMPANY.

AN extraordinary general meeting of the shareholders of this company has been held under the presidency of Mr. Ernest Noel, M.P., for the election of additional directors. The chairman moved that Mr. Thomas Brassey, M.P. be added to the board, and the Rev. H. Le Bas seconded the motion, which was carried, as was also a resolution for the election of Mr. John Gilbert Talbot, M.P. as an additional director. Mr. Noel stated that Mr. Talbot had agreed to accept office to help the present board to extricate the affairs of the company from great difficulties. So far as he (the chairman) could see, they had already improved their position, and had got the whole of the estates into very fair order. Although they could not now look for the returns which might otherwise have been expected from such an undertaking, still they might look forward to substantial returns from it. Messrs. John Pearce and Richard Elisha Farrant were nominated as directors; and, on the motion of Mr. Hartley, a resolution was passed adjourning the meeting to September 4, by which time the two above-named gentlemen would be eligible for election. The chairman, replying to a vote of thanks, trusted that by March next the board would be in a position to lay before the shareholders a balance-sheet of a re-assuring character.

TALLERMAN'S FRESH AND PRESERVED MEAT COMPANY (LIMITED).

AT the meeting of Tallerman's Company (Limited) the report for the half-year was read and approved. From February 19 to June 30, the receipts reached 25,564*l.* and some odd shillings. Had the company, the report states, had the means of direct delivery to its numerous customers the receipts would have exceeded this amount. The company's capital account is at present 38,285*l.*, which is made up of 7,657 shares of 5*l.* each. After 200*l.* of bad debts, etc., have been written off, the declared dividend is 5 per cent., and a balance on profit and loss account of 458*l.* remains to the good. By certain wharf transactions the company gains a rental of 235*l.*, and the report adds—'The company has not only been relieved of an expenditure of 2,000*l.* per annum, but acquires an annual net profit of 235*l.* upon a long leasehold property, which has thereby become a valuable asset.' The value of fresh meat from America between the dates from October, 1875, to the end of June this year was 1,580,712*l.*, reckoning the meat at only 6*d.* per pound. The directors are in expectation that shipments will increase in the future and mention that arrangements are made for slaughtering the cattle in the grazing districts of the Western states and carrying the dead meat in refrigerator cars to the seaboard for shipment, Negotiations are also being carried on with the view of establishing a fresh meat trade with the continent in localities within three or four days' distance from London. The Frigorifique landed meat in excellent condition after 120 days. The company has arranged to employ this vessel as soon as she is ready for sea. The directors report also that the carcases of 500 bullocks and a like number of sheep are coming by the *Norham* from Sydney.

Medical Officers' Reports.

CITY OF LONDON.—The medical officer of health (Dr. Sedgwick Saunders) reports that during the recess 1,579 houses have been inspected, of which 176 required sanitary improvements in various particulars, 288 of the sanitary orders of the commission had been executed, and 80 were in hand. These included cases of smoke nuisance, overcrowding, cellar dwellings, defective drainage, improper storage of live stock, tallow melting, and deficient water-supply; 394 articles had been received at the disinfecting chamber, and disinfected and returned to the owners; 15 bodies had been received at the mortuary and kept in decent custody until the time of burial. The markets and slaughter-houses had been duly inspected, and the officers had condemned 13¼ tons of meat as unfit for human food, all of which was destroyed. Several prosecutions for sending up bad meat were ordered. The general health of the city during the recess had been satisfactory, and the deaths below the average of the last four years. The usual summer diseases had been fewer in number, and of a favourable type. The number of cases of small-pox had been steadily decreasing, and he was happy to inform the court that none had been reported for upwards of a fortnight. In the metropolis the same tendency existed, as shown by a diminution of the number of deaths, the figures being for the last seven weeks 27, 22, 20, 23, 11, 20, and 8. In the city eight cases had been reported, all of which were promptly removed to hospital with one exception. During the last seven weeks 139 deaths were registered, and 151 births.

HOLBORN.—This large district has a very mixed population, the west portion having a large number of the professional classes, while the south and east parts contain many Irish and Italians. Dr. Septimus Gibbon, the medical officer of health of the district, has just made his annual report up to Lady-day, and this contains many important facts bearing upon the general sanitary condition of London. Dr. Gibbon, who addresses his report to the Holborn Board of Works, states that though the registrar-general refuses to supply the registered particulars of deaths, yet, by the courtesy and public spirit of the medical practitioners and local registrars, most of the cases and deaths arising from epidemic and preventable diseases are brought to notice. The births of the district show an increase of 4·8 per cent. on the previous year, but a decrease of 35 in the whole on the average number for the previous ten years, and the birth-rate is only 28·2 per 1,000, as compared with 36·5 of the whole metropolis. Dr. Gibbon thinks that the apparent lowness of the birth-rate in the district 'is in some degree to be attributed to the fact that many births among the Irish and Italians of

the district escape registration;' and he adds, 'Notwithstanding the provisions of the new Registration Act, evidence has been afforded to me, during the present epidemic of small-pox, of the births of six children not having been registered.' There was a marked decrease of the death-rate in the year. In the central districts, of which Holborn forms a part, the rate of mortality was 24·0 as against 26·1 of the previous year, while the Holborn district itself, after deducting the deaths of non-residents in institutions, gave a mortality of 21·02, or 1·28 below the general death-rate of the metropolis. The lowest death-rate was in the west, and the highest in the east of the district. The deaths from violence had decreased, and Dr. Gibbon expresses the hope and belief that now the playgrounds of Board schools are to be opened and made available to all the children of the various neighbourhoods, the number of children whose lives are annually sacrificed by vehicles will be still further decreased. Dr. Gibbon, in regard to the 'smoke nuisance,' says it is to be hoped that before long Lord Palmerston's beneficial legislation in the matter may be extended so as to compel domestic fires as well as furnaces to consume their own smoke. Dr. Gibbon calls attention to the increase of a disease from the inroads of which some parts of the kingdom are protected by special legislation, and adds, 'the figures (the increase from 26 to 59), however, give a very imperfect and erroneous notion of both the prevalence and fatality of this terrible disease. It is hereditary, and affects, more or less, every organ and tissue of the body, and in this way is the parent of a legion of diseases. There is much evidence to show that it causes more deaths, diseases, and deterioration of health than all other preventable diseases put together.' Dr. Gibbon states that Torrens's Act has been applied in the year to seven places, and his list of sanitary improvements carried out show that even in Central London at the present time there are places where the elementary want of a supply of domestic water to houses has to be ordered under the authority of Act of Parliament. During the year 1,290 places have been visited for sanitary needs. The district has now a mortuary, where dead bodies are removed 'from rooms inhabited for the most part by the living.'

ST. GEORGE, SOUTHWARK.—Dr. Bateson, as usual, presents a characteristic report, with extracts from various speeches and works, and refers also to the improved state of many of the dwellings of the poor, and congratulates the Vestry on the prospect of the removal of the fish-curing businesses, by the action of the Artisans' Dwellings Act, 1875. Three schemes have been approved at an estimated net cost of 33,353*l*. There were 2,099 births and 1,206 deaths, being at the rate of 21½ per 1,000 living. We have no information as to corrections for deaths in hospitals, except as regards small-pox, which are not included, and therefore vitiates the statistics to a certain extent. The same remark applies to the mortality (12·5 per 1,000 living) in Peabody's buildings as regards non-correction for deaths, if any, in hospitals. Dr. Bateson makes the following singular remark. Putrefaction is accompanied by the generation of gases, which must be got rid of, otherwise they would penetrate into our houses and corrode the pipes as surely as rats would nibble them. He also refers to the frequently injurious effects of a fashionable dress.

Law Reports.

MILK AT NOTTINGHAM.

AT the Nottingham Town Hall, G. Pickburn, milk sal esman, was brought up charged with selling milk in an ad ulterated condition. The town clerk said there was no ex cuse for the defendant, as he plainly knew the result. H e also stated that out of twenty-five samples of milk re ceived at the borough analyst's office only two had been fo und in any way pure, and therefore the defendant and those like him were taking an unfair advantage of honest tradesmen. The chief sanitary inspector stated that on the day in question he was in Alfred Street North, when he saw the defendant with two milk cans in his cart. From one of them he was selling milk to a shop, the other being covered with a cloth. He asked defendant for some milk, when he gave him some out of the uncovered can. Witness then told him he was an inspector, and required some from the other can. To this defendant said he could not have any as it was all sold. He, however, gave him some. Both samples he put into bottles, and sealed up in the presence of defendant, first giving him a portion of it, as required by the Act. The borough analyst certified that the sample taken from the uncovered can and labelled sample No. 2 was adulterated to the extent of 12·4 per cent. with water. Defendant alleged that he bought the milk from a person in the street, as he had not sufficient to supply an order he had, and could not go to Strelley, where he usually obtained his milk, and therefore did not know that it was anything but pure. The bench, however, considered this to be but a lame tale, and only said to deceive them. He would be fined 5*l*.; in default two months' imprisonment.

THE MORTMAIN ACT AND GUARDIANS OF THE POOR.

THE Court of Appeal has had before it the case of Luckraft *v.* Pridham, an appeal from a decision of Vice-Chancellor Hall. The question was whether, under the Mortmain Act, the Guardians of the Poor of Plymouth were capable of taking a moiety of certain freehold and leasehold houses, which had been devised by the will of the late Mr. W. R. Phillips, of that town. Mr. Phillips, by his will, gave to the defendants, Pridham and Luke, the residue of his estate, upon trust, to realise and give 'one half of the proceeds thereof to the different charities of Plymouth, the amount and charities to be at the discretion of my said trustees.' The estate consisted chiefly of freehold and leasehold houses which produced an income of over 2,000*l*. a year. After the death of Mr. Phillips, this action was brought for the administration of his estate, and the usual advertisements were issued for charities to come in and claim the bequest. No charity availed itself of the advertisements except the Guardians of the Poor. They asserted, as the fact was, that a special Act passed in the sixth year of Queen Anne constituted them a corporation, and expressly authorised them to receive lands or tenements by devise, without licence in mortmain. The question, therefore, was whether the general Mortmain Act of 9 George II., cap. 36, being subsequent in date to the special Act, took away the power which the guardians had under their special Act. The special Act was amended by Acts passed in the 32 George II., the 26 George III., and the 53 George III. The Vice-Chancellor held that the devise was void on the ground that the general Mortmain Act applies to every devise to charitable uses, unless expressly excepted. The guardians appealed. The Master of the Rolls said that the recitals contained in the Act 6 Anne showed that its intention was to dispense with the necessity of a licence to hold lands in mortmain. At that time there was no law preventing a devise of lands by will to charitable uses. Then came the general Mortmain Act, the object of which was to protect heirs from being disinherited. It was an act for the benefit of lawful heirs. It enacted in substance that lands should not be given to charitable uses, except by deed executed before two witnesses twelve months before the death of the grantor, and enrolled in Chancery within six months after the execution thereof. In other words, the Act absolutely destroyed the power formerly possessed by men in England of devising land by will to charitable uses. Why the Act should not apply to this charity, as well as to others, his lordship could not conceive. Up to that point the case appeared to him absolutely unarguable. The subsequent private Acts only continued or extended the powers conferred by the Act of Anne, but did not alter their meaning or effect;

and, that being so, it appeared to his lordship that there was no pretence for saying that the legislature had repealed that part of the Charitable Uses Act which prevented a devise to charitable uses. Therefore, this attempted devise was null and void, and the decision of the Vice-Chancellor was right.

BREACH OF BUILDING BY-LAWS.

F. CRUST, builder, was summoned by the Handsworth Local Board for not complying with the regulations of the board. Mr. Underhill stated that in November, 1876, the defendant began building eight houses. Shortly after he commenced operations the Plans Committee of the board went over the buildings, and it was perfectly evident that he was erecting them with the utmost disregard both for the safety of the buildings, and of the comfort of those who would have to inhabit them. They found that the damp course was not properly attended to, that the brickwork was exceedingly bad, and that the houses literally had no ventilation. But at that time the by-laws were not in existence, and all the local board could do was in the way of remonstrance. Mr. Crust promised to make alterations with reference to them, but as far as he could understand, very few of the promises were acted upon. In February last Mr. Crust submitted to the board plans of thirty-five houses, being a continuation of the first eight. The board made certain alterations in the plans, pointing out, amongst other things, that the walls should be 9 inches thick instead of 4½ inches. The defendant was supplied with a copy of the by-laws, and told to erect the houses in accordance therewith, so that there could be no question that he had not had full and ample warning as to his liability. The surveyor inspected the buildings, and had shown great forbearance towards the defendant, being by no means desirous of pressing unduly upon him. He called the attention of Mr. Crust to several defects in the construction of the houses, and on April 8 wrote to him informing him that the new buildings were being erected contrary to the by-laws, and requesting him to show cause why the building or works should not be removed, altered, or pulled down. The board had power to compel him to pull the building down, but they merely invited him to alter the construction in conformity with the by-laws and regulations. Mr. Crust promised that he would act in accordance with the by-laws, and a partial alteration was made with regard to eight houses. A final notice was given to the defendant that unless he made the required alterations within forty-eight hours he would, in addition to the penalties prescribed by the by-laws, be liable to the penalty of 5*l.* for each offence, and in the case of each continuing offence to a further penalty of 40*s.* for each day. Mr. Plevins gave evidence as to the improper ventilation and other defects; and corroborative evidence was given by Mr. Martin, of the firm of Martin and Chamberlain, architects and surveyors, Birmingham, by Mr. Burman, surveyor to the board, and other witnesses. A number of technical objections were raised by the defendant's counsel, and after lasting upwards of three hours the case was adjourned till September 29.

PROVISIONAL ORDERS.

AN important circular has been issued by the Local Government Board with regard to Lord Redesdale's notice of motion, which affects local authorities throughout the country. His lordship proposes that the House of Lords should fix comparatively early days in the session, after which no bills confirming provisional orders under the several statutes (Public Health Act, Lands Clauses Act, etc.) will be taken. The effect of this proposal, if accepted by the House, will be to make it necessary that the bills should be introduced much earlier than usual. The applications for provisional orders should, therefore, reach the Local Government Board by an early date. The notice of Lord Redesdale is to propose that no bill originating in the Upper House to confirm provisional orders shall be read a first time after Tuesday, April 9; and that no such bill brought from the House of Commons shall be read a second time after Tuesday, June 18. Some time must necessarily elapse after the application has been received by the Local Government Board before the provisional order can be issued, and, therefore, before the confirming bill can be introduced. It is in almost all cases requisite that a local inquiry should be held in order that the requirements of the statute under which the application is made may be complied with. The board now annually receive about 100 applications for provisional orders, and the number of inspectors by whom the inquiries are held is very limited. The Board has therefore deemed it desirable to fix January 1 as the date before which all applications for provisional orders under the Public Health Act, 1875, and the Artisans' and Labourers Dwellings Improvement Act, 1875, must be made, with this exception—that where the application is for an order to put in force the compulsory powers of the Lands Clauses Consolidation Acts, or to confirm an improvement scheme under the Artisans' and Labourers' Dwellings Improvement Act, and the advertisements were not published till November, the application may be received not later than February 1. Attention, however, is drawn in the circular to the provisions in section 176 of the Public Health Act, 1875, which enables sanitary authorities to issue in September and October, or October and November, the advertisements and notices required before applying for a provisional order to obtain lands by compulsory purchase; and it appears to the Board very desirable that the sanitary authorities should use this power. A similar observation applies to the Artisans' Dwellings Act. Detailed instructions have been prepared under the Public Health Act, and also under the Artisans' Dwellings Act, which can be obtained on application to the Board in cases where they are required. The Board trust that the sanitary authorities will co-operate with them by forwarding as early as practicable any application for a provisional order.

WHAT IS A FACTORY?

AT Guildhall, Charles Starbuck, of 4, Distaff Lane, packer, appeared before Alderman Nottage in answer to summonses taken out against him for breaches of the Factory Act. The offences alleged were that Starbuck employed two boys under the age of thirteen years in his factory without having registered their names on the first day of their employment; that he had not obtained the necessary surgical certificates, and had employed them beyond the hours specified in the Act. Mr. Kent, for the defendant, said his contention was that Mr. Starbuck's premises did not come under the Act, as they were not a factory. He was a packer and finisher, not a manufacturer. Alderman Nottage asked for a definition of a cloth finisher. Mr. Oram said that a factory was a place where the owner 'finishes, hooks, laps, and makes up or packs any yarn or cloth of any material, or carries on any one or more of those processes.' Mr. Kent said that he did not admit that this was a factory. Mr. Oram said the defendant was known in the City as a cloth finisher and a packer, and did all the work that was necessary to finish cloth for the market or for export. He employed the children all day, he did not register them, and he did not get a certificate of health with them. The two in question had been discharged, and would not be taken on again. Alderman Nottage asked whether it was worth while, under the circumstances, to go on with the summonses, as the Government had gained its object. Mr. Oram said he would be content to take a conviction on one summons and withdraw the others on payment of costs. Mr. Kent protested against such a course, as he objected to a conviction. If the case was decided against him he should take it further, because he contended that the defendant's premises were not a factory, and that Mr. Oram, on his own showing, was out of court. Alderman Nottage thought that, as the defendant had undertaken that no more children should be employed, the summonses

might be withdrawn. Mr. Oram said that the defendant had not got the regulations of the Factory Act fixed up in his factory. Would he place them up, as required by the Act? Mr. Kent said he would. Alderman Nottage said that he thought it was a case in which each party should pay their own costs. Mr. Oram had gained all he wanted, and the defendant had been put to much larger costs than the complainant. Mr. Oram said he could not consent to that, for he would have to inform the Home Secretary why the summonses were withdrawn without costs. Alderman Nottage said that he would remit the Court fees, so that there would be no costs. The summonses were then withdrawn, and the fees returned.

THE STORAGE OF WATER.

A DOCUMENT of some importance connected with the water-supply, has recently been issued by order of the House of Lords, in a report of a select committee appointed to inquire into the operation of existing statutes in regard to the formation of and proceedings by commissioners of Sewers and Conservancy, Drainage, and River Navigation Boards, 'to consider by what means such bodies may be more conveniently and inexpensively constituted, their procedure improved, and their powers enlarged so as to provide more efficiently for the storage of water, the prevention of floods, and the discharge of other functions appertaining to such boards.' The committee state that they had examined a number of witnesses. Referring to the damage done by floods last winter, prominence is given to the very general adoption of the system of 'subsoil drainage,' owing to which a greatly augmented quantity of water is rapidly carried into rivers; and to the deterioration which is constantly occurring in the channels of the rivers whereby they are rendered 'inadequate to carry off the drainage of their respective watersheds.' One of the principal points to which the committee have directed their attention has been the best means of preserving the channels and outfalls of rivers in such a condition as to suffice for the discharge with reasonable facility of the waters flowing into them; and in order to arrive at a judgment they had inquired into the manner in which the conservancy of rivers is regulated. The first statute on the subject, and upon which all subsequent legislation was founded, was the 23 Henry VIII., cap. 5, which provided for the appointment of Commissioners of Sewers. The committee report, 'it is generally acknowledged that these Acts have not worked successfully for the prevention of floods, and this seems to be partly owing to defects in the machinery provided for carrying the Acts into execution, and partly to obstruction caused by private legislation.' The committee, although of opinion that means should be taken to ensure the appointment of a conservancy board for each watershed area, consider that it should, in the first instance, emanate, if possible, from persons having an interest in the district. Upon receiving such application the department of Government in whose province the matter may lie should send an inspector to the locality, who should ascertain the necessities and capacities of the district and suggest the area and proportions of taxation. A scheme could be prepared, and after inquiry, be embodied in a Provisional Order and submitted to Parliament for confirmation. The committee 'are also of opinion that the conservancy boards should be enabled to execute the powers for the prevention of the pollution of rivers conferred on local authorities by the Rivers Pollution Prevention Act,' and should also be able to take steps to provide for the opening of mill-gates in the event of floods or expected floods; and to avert floods, among other measures, that of embankment had been suggested to the committee. To facilitate the legislation necessary, the committee consider that a general statute resembling the Companies Clauses or Lands Clauses Consolidation Acts should be passed, embracing all the provisions to be incorporated with and to form part of every provisional order issued for the constitution of a conservancy district. With regard to the principle of assessment which should be adopted in raising the rates which would be required to meet the expenses, the committee consider that towns and houses should contribute, and that the taxation required for drainage purposes should be levied on the basis of rateable value. It was stated to the committee that there were some 2,000 and 3,000 private Acts now in operation which relate to drainage, navigation, and matters of a similar kind, and hence the importance of legislation on the subject of 'the storage of water, and the prevention of floods.'

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

WHERE IS THE MEDICAL OFFICER OF HEALTH?

(*To the Editor of the* SANITARY RECORD.)

SIR,—I have only recently read a letter signed 'Wanderer,' which appeared in the SANITARY RECORD some few weeks since, in reference to the open cesspool near Southam, and thinking that possibly 'Wanderer' might have wandered from the region of facts into the realms of fancy, I have made some inquiries in the neighbourhood, and I am told that the state of things is very much as stated. There certainly is (or was a few weeks since) a filthy pond of stagnant water, abutting on the highroad, into which pond the neighbouring cottages discharged their sewerage. The particular nature and properties of the deposit it would be difficult to indicate with the precision of a public analyst, but the decomposing dogs and cats are, I should say, amongst the least offensive of the *foreign bodies* to be found there. These are not only visible to the naked eye, but at times painfully evident to another sense. The microscope would doubtless reveal wonderful varieties of living organisms, if any of the inhabitants have a taste for this department of natural history.

I am told that it is not only the so-called 'sanitary authority' who desire to preserve this fragrant and fertile field of investigation, but that some of the inhabitants do not desire its removal, one objection being *that the village children are accustomed to bathe there.* There is no accounting for children's taste (especially in the country), but these children must not only be devoid of, to say the least, good taste, but also destitute of the power of smell. And then another question suggests itself—if these vulgar little villagers do bathe in such a filthy place (which I can scarcely believe) how much they must have needed some sort of sanitary discipline ere they were driven to adopt so desperate a remedy? Of course sanitary authorities must not altogether ignore vested interests, but what real interest can any sensible person have in preserving an open cesspool in a public place? At least it is liable to become a focus of fever at any time, and it would be interesting to know how many cases of fever have occurred in this Warwickshire village since the prevailing disregard of sanitary laws? and lastly, *is there, or is there not, a medical officer of health?*

ONE WHO KNOWS THE NEIGHBOURHOOD.

SCARLET FEVER AT WALSALL.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Some of my children have been suffering from scarlet fever owing to their staying at a house in Rhyl (not Brighton) which was infected with this disease. We took every precaution before taking the rooms, so far as making inquiries of the landlady of the house whether there had been any infectious disease in the house for the past year or so, to which we got a decided negative. My wife, who was staying with the children, observing a medical man coming to the house frequently, and hearing

little rumours afloat, became suspicious and commenced a thorough inquiry. The landlady, to appease her, showed her a certificate from the medical man in attendance, stating that the case he was attending was not infectious, provided people kept out of the room. Not being satisfied with this, however, she called on him telling him she hoped he would be candid, as she was herself the wife of a medical man, Doctor Cooke, of Aldridge; to which he immediately replied 'Take your children home at once' as the case referred to in his certificate was scarlet fever. You may guess my disgust, for I had six little children in the house, three that could not walk, two twins that have been endless care and anxiety to us, to find them landed in a house infected with such a horrible disease, and to discover such a conspiracy to conceal it. Since then a medical friend and neighbour has informed me that a child of his contracted scarlet fever in the same house some time ago. I think such conduct on the part of lodging-house keepers ought to be severely dealt with, and the same punishment extended to visitors for daring to take their children only just convalescent from infectious diseases (which I fear is too often the case), to infect the very places which the public ought scrupulously to protect. I think a public prosecutor would be very desirable for the purpose of dealing with such cases.

WM. HARRY COOKE, M.D.
Walmer House, Aldridge, Walsall.

Reviews.

A Supplement to the Seventh Edition of a Digest of the Law relating to Public Health and Local Government. By G. F. CHAMBERS, of the Inner Temple, Barrister-at-Law. Stevens and Sons, 119 Chancery Lane.

THE plan of this work follows that of the book to which it is a supplement, which is so well known that a particular description of it is now unnecessary. We may state, however, that the author appears to have taken great pains to carry on the principal work forwards from 1875 up to the very current month, September, 1877. In Part I. we have a summary of the various Public Health and Local Government Statutes passed in the Sessions of 1876 and 1877, of which the most important are—The 'Rivers Pollution Act' and the New Act for facilitating the Construction of Reservoirs for the Water-Supply of Rural Districts. The 'Commons Act, 1876,' finds a place here, so far as regards the powers in relation to the subject of commons which are conferred by the Act on urban sanitary authorities. Part II. contains an epitome of all the cases under 'The Public Health Act, 1875,' and other Acts which have been decided by the superior courts since 1875. In Part III. we have various recent and important circulars and other official documents issued from the Local Government Board, one of the latest and most important of which is dated August 22, 1877, and supplies instructions as to applications for provisional orders under the 'Public Health Act,' which are to be made during the Session of 1878. In Part IV. we have the full text of the new model by-laws issued two or three weeks ago by the Local Government Board. It is almost too soon to criticise these, but Mr. Chambers, in his preface, alludes to the advantages which may be expected to flow from the general adoption of a uniform, or nearly uniform, code of local board by-laws for the whole of England, but he seems to imply that few places will find it safe to adopt in their integrity the new by-laws without adding to them. However, it is clearly desirable that they should be widely circulated and carefully studied as soon as possible, even by the officers of boards which have no present intention of adopting them. It will be found a great convenience to many persons that these by-laws should have been reprinted in this 'Supplement.' The volume closes with a reprint of all the recent Acts of Parliament relating to the work of urban and rural sanitary authorities. We need not say more by way of review than to add that possessors of the current edition of Mr. Chambers's 'Digest' should forthwith possess themselves of this 'Supplement,' unless indeed they prefer to have the two volumes in one cover, a form of it which is obtainable and at a cost which is low considering how much useful information is given.

Weekly Returns of the Mortality and Meteorology of Boston, U.S.A.

THESE returns are in some respects an improvement on those issued by our Registrar-General, as they give the deaths from all causes for each day in the week, as well from twenty-two separate diseases; also the number of deaths at the following age periods, viz., under 1, between 1 and 2, 2 and 5, and above 70 years of age. The totals of deaths under the twenty-three headings are given for the week, as well as the annual death-rate, and other important information. It is easy from these to trace the rise and progress of an epidemic, and to calculate the effect on the public health of variations in the temperature of the air. Of course in making such comparisons, time must be allowed for the duration of the illness previous to death, otherwise erroneous results would be obtained. There would also be the advantage of being able to ascertain the number of deaths in a month of thirty or thirty-one days, which cannot be done with the Registrar-General's returns. The meteorological observations differ from those usually made in this country, as they are taken at 7 A.M., 2 P.M., and 9 P.M., against 9 A.M., 3 P.M., and 9 P.M., which are the hours usually adopted here. The mean temperature is not the average of the three observations, and of the maximum and minimum, but is corrected in some way that we cannot trace, as tenths of a degree are not used. The barometer readings at 7, 2, and 9 o'clock are also printed, instead of the mean only as in our returns, which is a decided improvement. Several other useful meteorological observations are also recorded three times a day, as well as the duration of rain and total rainfall.

Sanitary Invention.

LESLIE'S ALMONDISED COD-LIVER OIL.

THIS is an excellent specimen of cod-liver oil of fine quality and delicate flavour, which in its combination with almond flavour is among the most creditable examples of elegant pharmacy to which our attention has been directed. Cod-liver oil, though a valuable medicine, is so repugnant to some constitutions in its simple state as to render its employment likely to produce nausea and other unpleasant effects. The preparation under notice, however, contains sufficient flavouring to remove the taste of the oil without detracting from its therapeutic value. We have tried its effect upon the most delicate constitutions with marked success. So well are the odour and taste of the oil disguised that children will take the preparation with avidity.

To obtain the greatest benefit from the administration of this form of cod-liver oil, it should be taken mixed with milk, these two sustaining foods producing desirable alimentary and therapeutic results.

For all purposes where cod-liver oil is generally made use of, we would strongly advise a trial of Leslie's Almondised Cod-Liver Oil, prepared by Messrs. Leslie and Co., of Bond Court House, Walbrook, E.C.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

DAY, Edward Joseph, M.R.C.S. Eng., L.S.A. Lond., has been appointed a Medical Officer of Health for the Dorchester Rural Sanitary District, at 50*l.*, for one year.

EDMONDSON, Mr. William, has been appointed Collector to the Tong Street Local Board and Urban Sanitary Authority, Yorkshire, vice Middleton, whose appointment expires 29th instant.

EVA, Mr. Thomas, has been appointed Surveyor to the Corporation and Urban Sanitary Authority of Helston, Cornwall, vice Reed, deceased.

HAINES, Alfred Henry, M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the Wisbech Port Sanitary District, vice Ewen, resigned.

HARRISON, Charles, M.D., Univ. St. And., M.R.C.S. Eng., L.S.A. Lond., has been appointed Certifying Factory Surgeon for Lincoln, vice Broadbent, deceased.

MEDLAND, Mr. Joseph, has been appointed Inspector of Nuisances and School Attendance Officer for the Okehampton Rural Sanitary District.

NOBLE, Mr. John, has been appointed Clerk to the Garstang Guardians and Rural Sanitary Authority, Lancashire, vice Mr. Thomas Noble, resigned.

RENDALL, William, L.R.C.P. Lond., M.R.C.S. Eng., L.S.A. Lond., has been appointed a Medical Officer of Health for the Dorchester Rural Sanitary District, at 50*l.*, for one year.

SANDFORD, Horace Vavasour, L.R.C.P. Lond., L.F.P.S. Glasg., has been re-appointed Medical Officer of Health for the Bromyard, Hereford, Ledbury, Leominster, and Weobley Rural Sanitary Districts, at 550*l.* per ann., for three years.

SAVILL, Mr. Robert, has been elected a Member of the Watford Local Board and Urban Sanitary Authority, vice Mayell, resigned.

THOMSON, William, M.D. Glasg., has been re-appointed Medical Officer of Health for the Peterborough Rural and Urban Sanitary Districts.

WILSON, George, M.D. Univ. Edin., has been re-appointed Medical Officer of Health for the Lillington, Milverton, Rugby, and Warwick Urban, and Meriden, Rugby, Solihull, Southam, and Warwick Rural, Sanitary Districts, at 800*l.* per ann., for three years.

VACANCIES.

BELPER LOCAL BOARD AND URBAN SANITARY AUTHORITY, Derbyshire. Inspector of Nuisances: 30*l.* per ann. Application to Joseph Pym, Clerk.

BRECON RURAL SANITARY DISTRICT. Inspector of Nuisances: 120*l.* per ann.

CAMBRIDGE. Public Analyst.

CAMBRIDGESHIRE. Public Analyst.

COLCHESTER, BOROUGH OF, AND URBAN SANITARY DISTRICT. Inspector of Nuisances: 105*l.* per ann. Application, 25th instant, to Henry Jones, Town Clerk.

DRONFIELD LOCAL BOARD AND URBAN SANITARY AUTHORITY, Derbyshire. Surveyor and Inspector of Nuisances. Application to George Jenkinson, Clerk.

HUNTINGDONSHIRE. Public Analyst.

ISLE OF ELY. Public Analyst.

KIRKHAM URBAN SANITARY DISTRICT, Lancashire. Inspector of Nuisances: 20*l.* per ann. Application, October 1, to W. J. Dickson, Clerk to the Authority.

KIRKLEATHAM LOCAL BOARD AND URBAN SANITARY AUTHORITY, Yorkshire. Surveyor and Inspector of Nuisances: 80*l.* and 40*l.* per ann. Application, October 1, to M. B. Dodds, Clerk.

STOCKTON-ON-TEES, CORPORATION AND URBAN SANITARY AUTHORITY OF. Surveyor: 300*l.* per ann. Application, 21st instant to H. G. Faber, Town Clerk.

SWINTON AND PENDLEBURY LOCAL BOARD AND URBAN SANITARY AUTHORITY, Lancashire. Surveyor. Application, October 1, to W. J. Hewetson, Clerk.

UPHOLLAND LOCAL BOARD AND URBAN SANITARY AUTHORITY, Lancashire. Surveyor, Inspector of Nuisances, and Collector: 120*l.* per ann. Application, October 3, to W. Berridge, Clerk.

OPEN COMPETITIONS AND CONTRACTS FOR SANITARY WORK.

The directors of the Bristol Waterworks Company desire to receive tenders for the erection of engine and boiler houses and other works required at their pumping station at Chelvey, about nine miles west of Bristol. Drawings, etc., may be seen at the company's offices, Small Street, Bristol, or at the office of John Taylor, Esq., the company's consulting engineer, 27, Great George Street, Westminster, London. Tenders to be delivered at the offices, Small Street, Bristol, on September 29.

The Corporation of Droitwich invite tenders for the construction of 300 yards of perforated pipe adits, and the construction of sluice tank, inspection shafts, and other works in connection with the works for supplying the town of Droitwich with water. The drawings, etc., may be seen on application to Mr. E. Pritchard, C.E., 21, Church Street, Warwick. Tenders to be delivered on or before September 22, to S. J. Tombs, Town Clerk.

The Board of Works for the Greenwich District is prepared to receive tenders for constructing about 860 ft. run of 3 ft. 6 in. by 2 ft. 4 in. brick sewer, and 50 ft. run of 15 in. pipe sewer in Camplin Street, Hatcham; 775 ft. run of 15 in. and 295 ft. run of 12 in. pipe sewer in Cassella Road, Hatcham; 595 ft. run of 15 in. and 185 ft. run of 12 in. pipe sewer in Billington Street, Hatcham; 370 ft. run of 15 in. pipe sewer in Egmont Street, Hatcham; and 920 ft. run of 12 in. pipe sewer n Brocklehurst Street, Hatcham, and other works according to specification. The specification, etc., can be seen at the offices of the Board, in the Greenwich Road, Greenwich. Tenders should be sent in to the Board's offices as above on September 26.

The Metropolitan Board of Works are desirous to receive tenders for the following works, viz., the construction of brick sewers, 735 ft. in length, or thereabouts, with other works in connection therewith, between Thomas Street and Weaver Street, Bethnal Green; the construction of a brick sewer, 2,000 ft. in length, or thereabouts, with other works in connection therewith, between Gray's Inn Road and Vernon Place, Bloomsbury: the construction of brick and concrete sewers, 2,400 ft. in length, or thereabouts, with other works in connection therewith, for the covering and diversion of a portion of the Stamford Brook Sewer, near the New Road, Hammersmith, all in the county of Middlesex. Particulars on application to Sir J. W. Bazalgette, C.B., engineer of the board, at the office, Spring Gardens. Tenders to the clerk of the board on September 27.

The Corporation of Manchester, being about to erect baths and washhouses on a plot of ground at New Islington, invite architects to send in designs in competition, for which the following premiums will be awarded: First premium, 200*l.*, to merge in the commission if the author is selected to superintend the erection of the buildings; second premium, 100*l.*; third premium, 50*l.* A plan of the site, etc., may be obtained on application at the City Surveyor's office. The designs must be addressed to the Chairman of the Baths and Washhouses Committee, and be delivered at the City Surveyor's office, Townhall, Manchester, on or before September 26.

SANITARY PATENTS.

2014. Improvements in means or apparatus for supporting human beings and enabling them to move on the surface of water. Walter Yeldham, Chester Terrace, Eaton Square, London.

1442. Improvements in receptacles for manure and other refuse collected from the streets of towns. John Jonas, Fenchurch Street, London.

2247. An improved antiseptic and disinfecting combination, and in the mode of supplying the same for use. Francis Thomas Bond, Gloucestershire.

2966. Improvements in and relating to furnaces and the mode of and apparatus for mechanically feeding them with fuel. Thomas Cass, Bolton, Lancashire.

2989. Improvements in smoke-consuming apparatus. Heinrich Conrad Ernest Eggers and Heinrich Christian Kirchmann, Hamburg, Germany.

ABSTRACTS OF SPECIFICATIONS.

4676. Traps for drains, etc. T. G. Greenstreet.

A covering of india-rubber with a slit in it is stretched across a wooden frame, over which an iron frame is passed. The sides of the slit yield to the weight of the slop, and close when it has passed.

4690. Drain pipes, etc. W. B. Whitton.

To each end of the ordinary sewage butt are added sockets placed back from, instead of at the ends of the pipe—the ends of pipe and socket being flush with each other. Metal rings are placed within the sockets; joints are made with cement.

4709. Valve water-closets. B. Finch.

The usual metal trap beneath the basin is replaced by an earthenware syphon trap, on which an iron plate is fixed, having a socket in which the outlet of the basin is fitted, and with ears depending on the underside in which the spindle of the basin valve is hung.

4721. Purifying sewer gas. E. Rombold.

A hollow frame placed beneath the ventilator's grating has its sides perforated and connected with water pipes, so that minute jets meet or cross each other, condensing any fœtid vapour.

4747. Lavatories. W. R. Johnson.

When a person wishes to use the bowl he has to stand on a treadle platform, and so closes an outlet valve, perhaps opening an inlet valve also.

4774. Filters. G. Bartlett.

The filter is self-cleansing. It has an upper compartment for the water from the source, then a reservoir for the filtered water, with perforated bottom; then a bed of filtering material, also with perforated bottom; then, (lowest) a refuse chamber. The water descends by a pipe to this last, and rises through the bed to the reservoir, whence it can be drawn off by a tap. When the filter bed has to be cleansed, the outlet of the refuse chamber is opened, and the water in the second chamber descends, carrying off impurities. Pipes admit air to the chamber of filtered water and to the refuse chamber.

NOTICE.

THE SANITARY RECORD *is published every Friday morning, and may be ordered direct from the Publishers. Annual Subscription, 17s. 4d.; free by post, 19s. 6d.*

Reading Covers to hold 12 numbers of THE SANITARY RECORD *have been prepared, and may be had direct from the Publishers or through any Bookseller, price 3s.*

Original Papers.

ON THE WATER-SUPPLY OF SEASIDE WATERING-PLACES.

BY G. W. WIGNER, F.C.S.

(*Continued from p.* 184.)

NEWHAVEN is, as far as I am aware, the only other small place which I have omitted. The town has a population of about 3,000, and the water company furnish a constant supply of water derived from wells. The supply is always available for fire. Mr. Hobbs, the surveyor, has forwarded me a sample, the analysis of which is as follows :—

	Grains per gallon.
Total solid matter	46·80
Loss on ignition after deducting combined carbonic acid	0·82
Lead and copper—none.	
Iron—slight trace.	
Chlorine, calculated as chloride of sodium .	13·46
Hardness before boiling, 17·8° (Clark's scale)	
,, after boiling, 7·4° ,, ,,	
Nitrogen as ammonia	0·0017
,, albuminoid ammonia . .	0·0033
,, nitrates	0·6300
,, nitrites	trace
Total nitrogen in these four forms . .	0·6350
Oxygen absorbed by organic matter . .	0·0040

The water had a very good pale blue colour, there was no suspended matter, and the smell and taste were quite satisfactory. The microscopical examination showed a good deal of vegetable fibre, but there were no animalculæ, and no distinct traces of any animal contamination. Probably on the whole it will be fairest to sort this water next to Herne Bay.

I think it will be advantageous to make a summary at this point of the results which I have already obtained and reported on, including Newhaven, which I have referred to in this paper, and the places to which I have referred in the five previous papers. I have now reported on the water-supply of the seaside places of five counties viz., NORFOLK, SUFFOLK, ESSEX, KENT, and SUSSEX. Some two or three of the small places were omitted in their proper geographical order, but I have since reported on their water-supplies, and a total of thirty-three towns is all to which I shall have to allude in summarising the results. This summary is, however, of great importance, because the watering places of these five counties are probably, with the exception of those in the Isle of Wight, the towns most frequently resorted to by London visitors.

The total residential population of these thirty-three places amounts to about 360,000; while during the season the visiting population is certainly not less, and probably more than 200,000 additional. It is probably quite fair to estimate that the average stay of a visitor at the seaside does not exceed one quarter of the duration of the visiting season; and assuming this to be true we shall have 800,000 visitors plus 350,000 inhabitants, or a total of much more than a million persons whose health is more or less dependent upon the purity or otherwise of the water-supply of these watering places. It is evident, therefore, that having examined the supply of these places in detail, as I have, it is desirable that I should, as far as possible, collate the results, so as to make them readily comprehensible by pointing out the salient features of each supply. I will do this as briefly as I can.

In twenty-six out of these thirty-three towns there is a public supply, which is derived either from wells or springs or from some other source, and which is forced through mains and supplied to householders. In fifteen of these towns, namely, Hunstanton, Yarmouth, Felixstow, Bright lingsea, Southend, Herne Bay, Westgate, Margate, Broadstairs, Hythe, Deal, Dover, Eastbourne, Newhaven, and Shoreham, the supply is constant, and therefore in this respect satisfactory. There are two towns from which I am not supplied with information on this important point, and it will not be surprising to learn that the two places are Lowestoft, the authorities of which positively refused to give me any information, and Walton-on-the-Naze. While in eight more places, viz., Sheerness, Ramsgate, Folkestone, Sandgate, Hastings, St. Leonards, Brighton, and Worthing, the supply is intermittent.

There are unfortunately seven towns. viz., Cromer, Wells, Clacton-on-the-Sea, Sandwich, Seaford, Littlehampton, and Bognor, where the supply is derived from private wells or streams only; and there are five more places, namely, Harwich, Walton, Yarmouth, Lowestoft, and Herne Bay, in which private wells are used in addition to the public supply. I was about to write 'are unfortunately used,' but when the character of some of the supplies of these towns is considered I cannot say that it is in all cases unfortunate, although it is always unsatisfactory.

I will refer first to the character of the water supplied from the different waterworks whether these waterworks are the property of the local authority or of a company, twenty-six towns in all. In no less than nine of these places there is either no filtration at all or the filtration is imperfect. The supplies of Hunstanton, Harwich and Dovercourt, Felixstow, Walton-on-the-Naze, Sheerness, Margate, Folkestone, Hastings, and St. Leonards, are all more or less turbid from the presence of suspended matter, that is, matter which could be and ought to be removed by filtration. This is unsatisfactory.

There are in all fifteen of these places where the supply must be considered as thoroughly good. It is difficult, and to some extent uncertain to attempt to arrange them in their proper order of merit, but I think that the following list is a fair approximation commencing with the best: Brighton, Shoreham, Dover, Sheerness, Deal, Eastbourne, Ramsgate, Westgate, Worthing, Folkestone, Sandgate, Hythe, Newhaven, Hastings, St. Leonards. It is a very unfortunate circumstance that this list of the best waters includes all but one of the intermittent supplies. Thus Brighton, Sheerness, Ramsgate, Worthing, Folkestone, Sandgate, Hastings and St. Leonards are all unfortunately subject to intermittent supply instead of constant. I will now as briefly as possible review the character of all these different waters, summarising the results in fact from those I have already written.

Brighton, Shoreham, Dover, and Sheerness, stand first. They are good waters; all but one under 13° of hardness, and all under 4° of permanent hardness, and it is only in the case of Sheerness that even the nitrates are at all objectionable in quantity. In the case of these samples the colour, smell, taste and the results of the microscopical observation were all satisfactory. The Deal supply has a

chalky taste, or it would rank with them; while Eastbourne is practically on a par, for, although the supply is in some respects a little worse, it is free from the chalky taste which characterises the Deal water. The supplies of Ramsgate and Westgate are almost alike, but both are harder than those I have just been alluding to, and although this hardness is mainly temporary, yet it must be viewed as a fault. The supply of Worthing is, on the whole, rather better than either of these last two. It has less total solid matter, and a lower proportion of total combined nitrogen. The supply of Folkestone shows a slight increase in the albuminoid ammonia, and the water has a chalky taste, but on the whole it is a good water. The supply of Sandgate contains 10 grains per gallon more total solid matter, but in other respects there is little to choose between this and the Folkestone water. The supply of Hythe in its general character resembles that of Sandgate. The supply of Newhaven differs greatly from that of Hythe in details, but taken collectively there is little to choose between them. The supplies of Hastings and St. Leonard's would probably class still higher than these, but that they have shown signs of variability. The last two samples drawn, however, accord very closely with the previous ones, and there seems, therefore, good reason to assume that the discordant samples were due to some sudden rainfall or similar cause.

I may sum up this first class, therefore, by saying that we have here fifteen watering-places, which have a residential population of more than a quarter of a million, and probably nearly half a million visitors, and that they are all supplied with good water. This is, as far as it goes, eminently satisfactory.

From these towns I pass on to those which are supplied with what must be considered as second-class waters. Hunstanton water is probably the best of this class, and it has the advantage of being a constant supply. The sample from this place was, however, of a bad colour, and turbid from suspended matter. The Southend supply, although constant, is saline, containing thirty-eight grains of salt per gallon. The Herne Bay supply is, as regards nitrogenous compounds, very pure. It, however, developed an offensive smell, after standing for a few days, and that leads me to somewhat modify the opinion I had first expressed, and rank it as a second-class water instead of a first-class one. The Lowestoft water had a pale yellow colour, and contained traces of suspended matter. The albuminoid ammonia was also high, and although the water was comparatively soft, it cannot rank as any higher than a bad second-class water. The supply of Brightlingsea would, as regards the albuminoid ammonia alone, pass as a first-class water, but the amount of nitrogen as nitrates is so heavy that it must be classed as a bad second-class. The Broadstairs supply contains nearly twice as much total solid matter as that of Brightlingsea, and it is in addition much more saline. The albuminoid ammonia is moderate, but the nitrates are high, and the results of the microscopical examination were very unsatisfactory. The Margate water not only contains as much total solid matter as the Broadstairs water, but has more salt than any water previously referred to in this summary, excepting Southend. The percentage of albuminoid ammonia alone would be sufficient to rank it as a second-class water; it contains heavy traces of suspended matter, and has a saline taste. Felixstowe probably has the right to be the last and worst of this class. The water contains more total combined nitrogen than any other sample in this series, and it is also a harder water, while the salt is as high as in the Broadstairs sample.

This second-class list is decidedly unsatisfactory. We have eight towns with a residential population of between 40,000 and 50,000, and probably some 100,000 visitors, all supplied with water of inferior quality—water in fact so bad in quality, that if it were supplied by a London water company, it would certainly in every case be emphatically condemned.

I now pass to the third-class waters, and find that Harwich and Dovercourt, Yarmouth, and Walton-on-the-Naze, all have supplies of a worse quality still than those which I have previously alluded to. Considering these samples one by one, I find that the Harwich and Dovercourt water contains more than 120 grains of total solid matter per gallon, 92 of which are common salt. It is of very little importance to note the low proportion of albuminoid ammonia, for the supply in the case is virtually diluted brine. The sample from Walton-on-the-Naze is worse still, for the proportion of salt reaches 182 grains per gallon. It is not exaggeration to call this brine instead of diluted brine. The Yarmouth supply is not saline, but the excessive proportion of albuminoid ammonia it contains brings it into the class of sewage instead of water. It is imperfectly filtered; it has a dirty yellow colour, and the microscopical appearance was extremely unsatisfactory.

Thus in this third and worst class I find three towns with a residential population of nearly 50,000, and visitors numbering probably nearly 100,000 per annum more, supplied with so-called water, which is not only totally unfit for human consumption, but which would be better described as either brine or sewage. It is quite time that such a matter as this was taken in hand.

It is hardly to be wondered at that the inhabitants of these last three towns should in part resort to other sources of supply instead of or in addition to the fluid which is supplied to them by the local authorities or water companies. I have taken samples of some of the private pumps and wells which they prefer to use instead of the public supply.

From Harwich and Dovercourt I took three samples from private wells and all were more or less bad. Two of the three samples were quite unfit for use, and the pumps should be at once closed. The third was bad. From Walton-on-the-Naze I had two samples from wells, as distinct from the public supply, and both of them were totally unfit for use. From Yarmouth I also took two samples from public pumps, and the results of both were so bad that, strictly speaking, they must be classed as sewage rather than water. So that these three unfortunate places are really no better off with the supply from their wells than with the public supply.

There are two other towns—Lowestoft and Herne Bay—in which pumps or wells are used to a certain extent in addition to the public supply. It will be remembered that the public supply of both these places ranks as second-class water. The sample taken from the well at Lowestoft was of such a character that it cannot be described in any other way than as sewage; while the water from the pump at Herne Bay—taking into account the almost entire absence of nitrates, may possibly be passed with

only a complaint of the 17 grains of salt per gallon which it contains.

So far I have referred to the watering-places in which there is a public supply—good, bad, or indifferent, and supplemented or not by means of private wells. I now pass on to consider the seven places in which there is no public supply of any kind, and the inhabitants are entirely dependent on wells or streams for their water. I should have preferred to sort these places to some extent in the order of their merit or rather of the merit of their water-supply; but when I collate the figures I find that the condemnation of these wells is so general that demerit would be the term if any sorting takes place, and accordingly I take the worst first.

The Sandwich market pump appears, on the whole, to claim pre-eminence as the worst of these private waters, and the only one that can fairly dispute the claim with it is the town pump at Cromer. Referring, however, to the Sandwich market pump, I find that the albuminoid ammonia is 0·0270 grains per gallon, and the nitrogen as nitrates is 4·1300 grains per gallon. The total solids are 103·80 grains per gallon, and the salt 29·07 grains per gallon. These figures show that, however valuable this fluid might be as a liquid manure, and it would be impossible to deny that it has a certain value in this respect, it certainly is not, nor should it be used as drinking water Sandwich Delf stream is better, but that is saying little; and as it swarms with living animalculæ, and has an offensive taste and smell, it, too, must be condemned as suitable for irrigation only.

Cromer town pump seems to entitle that place to rank next to Sandwich, although the samples from the other two pumps in the town are on the whole somewhat better. The town pump shows total solid matter 146·70 grains; salt, 48·91 grains; nitrogen as nitrates, 5·9500 grains. It swarmed with animalculæ, and the residue, when it was evaporated, showed crystals of urea. This liquid again is suited for irrigation, and not for drinking. The two other samples from Cromer are better, but I cannot say more than this. One of them was full of animalculæ, had a dirty colour, offensive smell, and putrid taste; while the other was dirty green, with an indescribably nauseous taste. These two samples must clearly be comprised in the sewage rather than the water class, and it is a good thing that the inhabitants of Cromer are setting to work to provide a proper supply. The two samples from Littlehampton seem to entitle that place to rank next to Cromer. The albuminoid ammonia and nitrogen as nitrates are excessive, while the salt is high in one and excessive in the other sample. Both samples had an offensive taste, and the results of the microscopical examination were unsatisfactory. These waters also are unfit for drinking. Wells may probably claim the next place in the list. The two samples from there differ greatly from each other. The albuminoid ammonia is comparatively moderate, and in one sample even low, but there is an excessive proportion of nitrates, together with a dirty yellow or greenish-yellow colour. The waters are very hard; one is excessively saline, and the microscopical results are very unsatisfactory. Both of these waters are clearly contaminated with drainage matter.

Clacton-on-Sea gives two samples which accord fairly with each other. The albuminoid ammonia in both brings them into the second class only; but one contains a very heavy proportion of nitrites and both are high in nitrates; and in one case the oxygen absorbed by the organic matter is excessive. Both samples had a bad colour. These again are contaminated waters. Bognor gives two samples which agree in nothing except their unsatisfactory character. One is so high in albuminoid ammonia as to run into the sewage class, the other is moderate in this respect. Both are heavily charged with nitrates and in one case the oxygen absorbed is very nearly the heaviest on the list. This sample had a urine yellow colour and offensive smell. The Bognor wells are clearly contaminated. Seaford only gives one sample. The albuminoid ammonia is lower than in any other of these wells excepting the hotel sample from Bognor. This is greatly in its favour; but the water has an excessive proportion of salt and other solid matters and a dangerous proportion of nitrates—not very much below the quantity present in the water drawn from the Sandwich market pump. The water had an offensive smell but the microscopical examination was fairly satisfactory. This, therefore, is the best of the well waters in this series although it makes a bad best.

The seven places supplied by wells only have a population of some 15,000, and probably a visiting population of 20,000 or 25,000 more. This gives a total of at least 35,000 people likely to be injured by drinking so-called water, the best sample of which is heavily contaminated and the worst of which is sewage itself. To say that this is a serious state of things is to put the matter mildly; it certainly needs attention at once.

At the commencement of these papers I expressed my intention of taking the towns round the coast in their geographical order; but the length to which they necessarily extend, and the late period of the season seem to render it more desirable to refer first to the towns on the northern coasts where the season ends earlier; and to take later on the southern coast towns where there are many visitors even late on into November. I shall, therefore, now follow up my previous papers by commencing in the next Number with the watering places on the YORKSHIRE, LANCASHIRE, and WELSH Coasts, starting with Bridlington, Filey, Scarborough, Whitby, Maryport, Whitehaven, Barrow, Morecambe, Blackpool, and Lytham.

(To be continued.)

THE ENCOURAGEMENT OF TYPHOID FEVER.

WE reprint the following sensible observations from an article bearing the above title, which was published in the *Builder* for August 18:

'The medical profession is the natural guardian of the public health. It is so *ex officio*. But it is more than that. A large acquaintance with many of the brightest ornaments of the medical profession, in and out of the British isles, leads to the certain conviction that the preservation of the health, not only of his patients, but of his neighbours, townsfolk, countrymen, is a motive that presses on the life of the doctor with unslumbering force. No offence need be taken by the members of any other class and calling if we attribute to our physicians and cultivated men of medical science and practice a degree of active and disinterested beneficence to which it is hard to find a parallel elsewhere. And it is to this that the appeal must now be made. It is this willing horse that we have to spur. We must

call on our physicians and family doctors to do some violence to their professional or personal delicacy of feeling in the interest of the common weal. There is little doubt that, as a rule, the higher are the intellectual and professional qualifications of the physician, the less is he disposed to volunteer advice. When he is consulted, he must, no doubt, probe the case of his patient to the bottom. And so he does; and in exact proportion, as far as our own experience extends, to the real value of the time of a physician, measured by quarters of an hour, is his apparent utter disregard to the lapse of time while he is investigating the symptoms, or listening to the complaints of a patient. But here the limit is drawn. Into the circumstances and habits of that patient, unless as they bear directly on the very point of his complaint, the physician shuns to pry. At times, indeed—all honour to them for the same—men of large practice will put some delicate or circuitous question as to the ability of a patient to pay golden fees without inconvenience; but solely with the view of remitting or reducing such fees in case of real need. But if a man goes to consult a physician, say as to the state of his heart, the physician will not be likely to question him as to the condition of his scullery or his sink.

'We very much fear that we shall have more and more royal, noble, and even medical victims to typhoid infection, unless the profession somewhat change their hand in this matter. It will be remembered that we are now more especially referring to the condition of connections with the sewers, and the escape into a house, or the water used to drink—as at Marlborough House, the War Office, and the Admiralty Offices—of that subtle and deadly gas which bears the germs of this disease, or at least, sets up the abnormal action which ultimately takes that form. It is to be expected, no doubt, that if called in to a typhoid case, the doctor will make some inquiry; just as, if he were called in to a case of consumption, he would inquire as to the dry or wet condition of the subsoil, and the state of the ventilation. But we mean something more than this. What we wish to become the universal practice is, that, when a medical man is consulted on any occasion, at his own house, or on visiting a patient, whatever be the illness, whatever the symptoms, he should make minute and searching inquiry as to the possible escape of sewer-gas, or the contamination of water; and, if he visit the patient, should not only inquire, but see for himself, what the state of things is. If one or two of the most eminent men would set the example it would be universally followed. Those men who failed to take the trouble would by-and-by be stigmatised as heedless and unreliable practitioners. We freely admit that there would, at first, be much that would be disagreeable in the change of practice. The doctor must make up his mind to be stared at; to lose so much time in the course of the day; even to affront, and perhaps lose patients. But what we have before said is enough to show how thoroughly we are convinced that these drawbacks would be freely borne by the majority of the profession, if once convinced that it was an unavoidable professional duty to make such searching inquiries. Nor do we for one moment doubt that in the additional success that would attend the practice of any man who adopted this course, there would very soon be found a compensation for all the discomfort. Many things that were really obscure to the physician himself would become clear to him if he made a point of overhauling the places in which his patients lived. Why do the children of such a family so often want the doctor? Why have they hoarseness, sore throats, catarrhs, want of appetite, red eyes, or a hundred other things? In the luxurious and well-appointed drawing-room to which the little things are brought down, when the doctor's carriage stops at the hall-door, the why may be very puzzling to the doctor himself. He knows, of course, what palliatives or restoratives to give, and he gives them. He prescribes, it may be, a wise course of regimen. He cures the little one for that week, and ten days after he is called in again.

'But if, instead of a state visit to the drawing-room, the physician insists on seeing his patient, so to speak, *in situ*, how different will be the case. "I cannot allow Sir X. Z. to go into the nursery when it is in such confusion," says the fond mother. That is not Sir X. Z.'s view of the case. The more confusion the better, so that it results from the children making horses of the chairs, or even tents of the scraps of carpet, which alone should be allowed in their dominions. But, ten to one, something worse than confusion will catch the eye,—or some sense,—of Sir X. Z. "What is this, nurse,—do you burn gas in the nursery?"—"Only at night, sir." "And how long has this smell been perceptible?" "Well, I think I perceived something when we came back to town; but we keep the door open. All gas-pipes smell, sir!" "Bring me a box of matches." The physician strikes a light and approaches it to the gas-pipe, runs it along to the joint, and a slight, fairy-like flash blows out the match. Or the hot-water pipes, carefully and conveniently laid into the night nursery, for the benefit of the bath, bring up around them a little jacket of foul air from the scullery or worse places. And then the closet itself,—but we need not go further. These are instances which must be familiar to us all. The little sufferer wanted the physician, indeed; but he was in far more urgent need of the gasfitter, or, rather, of the quiet, decided grave man, who should say, on going down. "My dear Mr. So-and-so, if you wish to have your children grow up healthy, send immediately to your tradesmen, and have all these matters looked to under proper advice."

'One example,—and we are sure it will awaken an echo of sympathy from many a one who has learned sad lessons from experience,—may serve for all. In spite of the labours of twenty or thirty years, of books, pamphlets, leading articles, lectures, speeches, Acts of Parliament; in spite of the loss of the noblest, the brightest, the dearest from our side by this fatal and subtle poison, to the spread of which, what are to a certain extent sanitary improvements, if unwatched by a competent eye, may directly tend; how many of our palaces, mansions, public offices, are still maintained as the seed-beds of preventable disease? We make one more appeal. Will not the eminent men who so well know the truth of what we say come forward, and endorse our recommendation; enforce it, rather, by turning advice into practice?'

THE Town Council of Newcastle-under-Lyme has leased from Lord Northesk a piece of land, in order to stop complaints of a sewage flow near the canal. The council has also resolved to spend 6,034*l.* 15*s.* in sewerage work, and has accepted the tender of Messrs. Holland and Co., of Leeds (1,129*l.* 10*s.*) for the supply of sewerage machinery.

THE
SANITARY RECORD.
FRIDAY, SEPTEMBER 28, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

A SEPARATE WATER-SUPPLY FOR LONDON.

WE last week examined Messrs. Easton and Bramwell's scheme for supplying London with a separate water-supply for potable use and fire extinguishing purposes, from the scientific and engineering points of view. We now proceed to state some objections from what may be termed the domestic aspect of the question. As every house requires water for washing and other purposes as well as for drinking and cooking, there is no doubt (although this intention is not explicitly stated in the paper) that it is proposed to duplicate the services; that is, to lay down a second pipe for every one now existing, to place at least one, if not several pure water-taps in each house besides those which are already there, to lay a smaller main parallel to each of the existing mains, in other words, to do precisely the same work as if there were no water-supply whatever in London, and it had all to be started from the beginning. The whole difference would be, that the new pipes would be smaller than the old ones, as they would only have to supply 4 gallons per head of the population instead of 33. In other respects, however, the difficulty, expense, and inconvenience of these enormous works would far surpass those which are now experienced when the water is laid on in a new street. For not only would everything have to be done over again, every street taken up, every pavement pulled to pieces, and every house entered, in all London—an operation which must extend over many years, and of which the full bearings must be studied to understand their incalculable cost and hindrance to every business and pleasure—but the great pressure in the pipes which it is the object of this scheme to provide would make every accident ten times as serious as it is at present, and multiply the causes of such accidents. For every pipe which bursts now, at least five would burst then, for the pressure is to be ten times as great, and though the pipes be stronger, bad joints, honey-combed castings, or careless laying are inevitable in all large works, and there cannot be the slightest doubt that the expense of the scheme has been enormously underrated. We venture to assert that the five and a half millions, stated by the promoters as the total expenditure, would not suffice to duplicate the mains and branches in all London, much less to lay the supply into each house, or to construct the reservoirs.

And supposing all were really satisfactorily done for the money, we cannot be sure that the health of the metropolis will really be benefited thereby. On the contrary. No one conversant with the habits of English servants, or even with those of the less educated and careful householders, will suppose for a moment, that if there are two taps in the house, one for drinking water and the other for washing, the housemaid will always use the right one for the right purpose. She, and the wife of the lodger as well, will use the one most handy. Nor will years of practice alter this. The consequence will be that the limited supply of drinking water will be largely wasted for other purposes, and that the great majority of the inhabitants, which is, after all, composed of the poorer, more ignorant, and less careful classes, will continue to drink Thames water more or less purified. This conclusion seems so inevitable that we cannot help wondering at its not having been yet brought forward. It makes the success of the whole scheme so doubtful, that we are at a loss to perceive in the whole plan any compensation for the immense inconvenience, trouble, and expense it will cause to every inhabitant of London.

We think we have said enough on these and other points to induce our readers to pause before accepting unconditionally this solution of the problem for supplying London with water, and we shall be glad to hear in what way the eminent engineers above mentioned propose getting over the difficulties we have pointed out.

THE ARTISANS' DWELLINGS ACT IN DUBLIN.

WE have to congratulate Dublin on the awakening of its sanitary authority. On July 13, Mr. O'Brien, one of the inspectors of the Irish Local Government Board, held an inquiry in conformity with the Artisans' Dwellings Act of 1875, relative to an improvement scheme proposed by the Corporation of Dublin.

Mr. E. Dwyer Gray, the well-known proprietor of the Dublin *Freeman's Journal*, undertook the office of counsel and advocate for the corporation. He brought forward his case in a thoroughly business-like manner, called and examined his witnesses, and cross-examined the objectors and their witnesses in a way that would do credit to an experienced counsel. As our readers are aware from the report of our special commissioner on the sanitary condition of Dublin, there are great numbers of unhealthy houses in many parts of the city.

Mr. Gray, as chairman of the Artisans' Dwellings Committee of the Dublin Corporation, briefly stated the circumstances under which the inquiry took place. They had been put in action by their consulting

sanitary officer, Dr. Mapother, who reported certain areas as being unhealthy. He reported twelve, and they selected two out of them.

The two areas selected were in the vicinity of Boyne Street and of the Coombe. Mr. Gray stated that, with reference to the estimated cost of the purchase of the sites of the two areas, they had obtained the opinion of a sworn valuer; for the first area the estimated cost was 8,513*l.* 15*s.*, and for the second 2,515*l.*, to which they added the expenses of the committee, of carrying out the scheme, law costs, &c. The committee had estimated a rental of 130*l.* for the Coombe area, or 30*l.* an acre, and 40*l.* for the Boyne Street site, or at the rate of 50*l.* per acre; this gave 170*l.* as against the gross outlay of 727*l.*, leaving a balance of 557*l.* per annum to the debit of the Dublin Improvement account, which would represent less than a farthing in the pound on the present valuation of the city. According to the estimate prepared by the collector-general's chief-clerk, the present gross rateable value of the two acres was 489*l.* 10*s.*, of which, owing to the nature of the property, the large proportion of 220*l.* was returned as property on which the rates were uncollectable, leaving 269*l.* 10*s.* only on which rates were received. It was calculated for the new property there would be a gross rateable value of 1,342*l.*, all of which would pay rates, as against 269*l.* 10*s.*, leaving an increased annual rateable value of 1,072*l.* 10*s.*, on which all the rates would be paid. They took the average rates at present levied for local purposes, including poor rates, but excluding police tax, at 7*s.* 8*d.*, which on 1,072*l.* 10*s.* would represent an additional revenue to the citizens of 411*l.* 12*s.* 6*d.* This latter sum, deducted from the annual cost of 557*l.*, would reduce the net cost to the citizens to 145*l.* 17*s.* 6*d.* per annum. Possibly these estimates were a little sanguine, for, of course, they could not know what amount of litigation and swearing they might have to contend against. In conclusion, he would mention that the cost estimated by the committee was as follows: Purchase of areas 1 and 2, as per estimate, 11,028*l.* 15*s.*; one year's loss of collectable rates, 103*l.* 6*s.* 2*d.*; preliminary expenses, 1,000*l.*; cost of roads, sewers, etc., 1,800*l.*, less value of materials, 300*l.*—1,500*l.*; contingencies, 3,367*l.* 18*s.* 10*d.* Total, 17,000*l.* If they went for the larger scheme the cost would be much increased, up to 35,000*l.*' Evidence was given of the necessity for, and in favour of the scheme, by Dr. Mapother, consulting sanitary officer (*Anglicè*, principal medical officer of health); Dr. Grimshaw, physician to Cork Street Fever Hospital and Stevens Hospital; Mr. Furlong, barrister-at-law, honorary secretary of the Dublin Sanitary Association; Mr. Neville, city engineer; Mr. Drew, architect to the Artisans' Dwellings Company; the secretary of the Public Health Committee, and the inspectors of nuisances.

The evidence in opposition to the scheme was of a peculiar and amusing character, and was given principally by house jobbers and others, who have been mainly instrumental in producing and perpetuating the state of things which it is the object of the Act to remove.

We must give Mr. Gray the full credit of having taken up and pushed forward the recommendations of the Dublin Sanitary Association, and we are glad to congratulate the Dublin Corporation upon the possession of at least one enlightened, energetic, and courageous sanitarian.

Notes of the Week.

THE Droitwich Town Council have resolved to apply to the Local Government Board for sanction to the borrowing of 5,000*l.* for the purchase of the gasworks.

AT a recent meeting of the Stoke Town Council, it was resolved to purchase the gasworks and undertaking of the Stoke and Fenton Gas Company. The price agreed upon is a little over 80,000*l.*

THE Sanitary Purposes Committee of the Preston urban sanitary authority have recommended that the salary of Mr. Henry O. Pilkington, the medical officer of health, should be increased from 100*l.* to 150*l.* per ann.

MR. EARLE'S appointment as inspector of nuisances for the Newbold and Dunston urban sanitary district does not cause a vacancy for a surveyor and inspector of nuisances for Dronfield. That gentleman now holds both.

THE eleventh winter session of the Working Men's College, 91 Blackfriars Road, commences on October 1, with evening classes in all the usual subjects of education. Technical classes for carpenters, bricklayers, and other trades are added, especially to interest artisans in their own education.

THE Shardlow Guardians and rural sanitary authority have been invested with urban powers over the parishes of Bramcote, Breaston, Breedon, Castle-Donington, Chilwell, Draycott, Kegworth, Little Eaton, Littleover, Melbourne, Normanton, Ockbrook, Sawley, Shardlow, Spondon, and Stanley.

THE question of curtailing a portion of their new sewerage works is under the consideration of the Melton Mowbray local board. At a meeting lately held Mr. Baldwin Latham explained that, owing to the large amount of extra work which had been done, costing from 1,200*l.* to 1,500*l.*, the amount of loan, 13,500*l.*, borrowed for sewerage works, would not suffice to complete the works as per plan. He intimated those portions of the work which might be omitted without limiting the efficiency of the scheme. Mr. Latham was asked to submit a detailed account of such portions, with the approximate saving to which their omission would lead.

SANITARY INSPECTION IN ST PANCRAS.

AT the last meeting of the St. Pancras Vestry the sanitary committee reported that in consequence of remarks made at an inquest held on the body of Catherine Sullivan, who was found dead at a house in Mary Place, condemning the owner of the house and the parish authorities for the bad state of the house, inspection had been made of Mary Place by Dr. Stevenson, the medical officer of health, who found the houses in a fair sanitary condition with the exception of two, which required lime-washing and traps on the drains. In the house in which the woman died, the staircases, walls, and passages were dirty. Mary

Place, although at one time one of the worst places in the parish, had, by the exertions of the sanitary officers become fairly healthy. The court contains nineteen houses and a population of 322. During the present year the only case of zymotic disease there was one of small-pox, showing that the exertions of the sanitary officers had not been without success. The committee were of opinion that the report exonerated them and their officers, an opinion which the vestry on the reading of the report, approved and adopted.

THE SANITARY STATE OF CAPE TOWN.

THE last mail news from the Cape in the daily papers of September 13 and 14, mention that the Governor, Sir Bartle Frere, had addressed the Town Council of Cape Town on the sanitary state of that city, a report on which contributed by Dr. W. J. Black, Surgeon-Major, appeared in the pages of the SANITARY RECORD of August 17, 1877.

He stated that its sanitary state was as bad as bad can be, and pointed out the urgent necessity of immediate reforms for the purpose of promoting the welfare of the inhabitants, and at the same time making Cape Town attractive as a residence for strangers. He knew no town of its size, and possessing such natural advantages, so deficient in all that appertains to efficient municipal economy, (*Times Mail News*, September 13, 14). Some of the insanitary points were briefly sketched, and remedies proposed to obviate them, in the course of the report above mentioned, and ample evidence was furnished up to a late date, by extracts from various local papers, to show the presence and continuance of very objectionable nuisances.

SANITARY MATTERS IN THE ENGADINE.

DR. LYLE writes to the *Times* on the sanitary condition of the Engadine, in the interest of English visitors who yearly seek this pleasant neighbourhood for recreation and health. After a stay of some weeks in the district, Dr. Lyle, and a medical friend who accompanied him on the tour, came to the conclusion that the sanitary condition of all the villages in the Upper Engadine could not well be worse than it is. The state of the atmosphere in and around Pontresina, St. Moritz, and Samaden is filthy in the extreme. The inhabitants do their best to nullify all the good fresh air confers. In an hotel at Pontresina, where Dr. Lyle stayed, there are two 'commodités,' both without traps, both in the house, and both centres from which the whole house is contaminated, so that the instant one comes into the house a nauseating atmosphere is perceived. There is an earth closet in this hotel, and it is quite as bad as the closet which communicates with the open drain without the medium of a trap. The condition of things is precisely similar at the large hotel at the Bernina Hospice. Passing through Pontresina from the Samaden side, first an open drain from the Rosegg Hotel, then about fifty different smells from private houses coming through open ventilators in the street, must be encountered. Dr. Lyle states that the remedy for this state of things is very easy. In the Upper Engadine there is an abundance of fresh running water. Every hotel should have its closets outside the house, connected by a covered way; these closets should be well trapped, and a stream of running water—which could easily be done—should be made to pass through the drains and empty itself into the fast-flowing river on which Pontresina stands. Thus a 'pure habitation' would be obtained, instead of a veritable Cologne on a small scale. English visitors should refrain from visiting the Engadine until the necessary sanitary improvements have been completed. The thanks of intending visitors to the Engadine are due to Dr. Lyle for his outspoken comments on a very dangerous state of things, and his example is highly to be commended to the numerous members of the profession travelling at this season of the year. The facts obtainable through such a skilled consensus of medical opinion would be extremely valuable to practitioners sending their patients abroad, as well as to independent travellers.

DILAPIDATIONS AND OVERCROWDING.

DR. EVANS reported to the Strand district board of works at their last meeting, that during the preceding month inspection has been made of 110 houses, and has appended lists of recommendations for sanitary improvements to be effected in 59 of them. He also sent in a certificate of the overcrowded state of four rooms in as many houses situate in Porter Street, Hollen Street, and Holles Street. Those rooms, each occupied by a separate family, contained in all twenty-eight inmates, the amount of space for each inmate varying from a maximum of 254 to a minimum of 119 cubic feet. At the last meeting orders were made for the carrying out of improvements in fifty-nine houses; in fourteen of them the work had been completed, in eighteen others it had been commenced, and in the remaining twenty-seven nothing had been done. Dr. Rogers asked in reference to the case of overcrowding, whether proceedings could not be taken against the owners without notice being given. He thought the board ought to act summarily in such matters. The clerk replied in the negative. The board directed that notice to repair, etc., be served on the owners of the houses mentioned in the medical officer's report.

ARTISANS' DWELLINGS.

AN important improvement has just been completed by the Improved Industrial Dwellings Company (of which Sir Sydney Waterlow is chairman), on about two acres of land lying between the Goswell and St. John's Street Roads, Clerkenwell, by the opening of a large number of dwellings for the artisan and labouring classes. Less than three years ago the site was occupied by old buildings, consisting of shops, sheds, barns, cattle lairs, and courts of the worst description; now it is covered with dwellings of the most approved character, containing every necessary convenience for the separate use of families of the working classes, with large playgrounds adjoining for the use of the children. The improvement has been effected at a cost of upwards of 75,000*l.*, but notwithstanding this large outlay, the rents are fixed at moderate amounts, and are such as the working classes can readily pay. As illustrating the great demand for proper house accommodation in this neighbourhood, as well as of the appreciation of the company's dwellings, it is stated that for 190 dwellings recently opened there were no fewer than 1,269 applications. The company has been at work for about fourteen years, and has now twenty-three estates in various parts of London, which accommodate nearly 3,000 families, or about 15,000 persons, and in course of construction there are over 600 dwellings, which will house about 3,000 additional persons, making 18,000 in all.

BATHING AT SCARBOROUGH.

AT the ordinary monthly meeting of the town council, the Pleasure Boats Committee reported, with regard to the recent fatal bathing accident to Miss Walker, of Leeds, that they entertained doubts as to the necessity for adopting the suggestions of the coroner's jury as to having a boat permanently stationed on the bathing ground; but with a view to prevent accidents to persons bathing in the sea, and restoring to animation persons apparently drowned, it be recommended to the council to adopt and enforce the observance of the following regulations: — '1. Every bathing machine shall be provided with a strong line 18 or 20 feet in length. 2. Each bathing machine proprietor shall have constantly ready for use, in connection with his machine, a suitable cork jacket and also a life buoy attached to a strong line about 60 feet in length, and such proprietor shall provide a competent person to take charge of and use these appliances. 3. Each bathing machine proprietor shall not allow any person to bathe from his machine when there is danger from a rough sea or heavy surf. 4. Copies of the following notices, published by the Royal Humane Society, shall be posted in the bathing machines, and in suitable positions along the beach, namely, "Important to

bathers," and "Directions for restoring the apparently dead." Resolved that a short code of instructions be forthwith prepared for the guidance of bathing machine proprietors and others as to the proceedings to be adopted when an alarm is raised as to any person being in danger whilst bathing.' The report was adopted.

OVERCROWDING IN SCHOOLS.

AT the meeting of the Whitechapel Board of Works on Monday evening, September 17, Mr. Wrack, the sanitary inspector, reported that upon inspection of Emery's Place, Butler Street, Spitalfields, he found on the ground floor of one of the houses a room containing 1,215 cubic feet of space, occupied as a school by a person who also dwelt and slept in the same room. On the occasion of the visit of the sanitary inspector the room was very much overcrowded, there being no fewer than twenty-three children huddled together on the bare floor, and the stifling atmosphere of the place was most sickening. On reporting the facts to the medical officer, a second visit was paid the following morning, when they found thirty-five children in the room, which allowed only 34 feet of cubic space for each child, and even this was further reduced by the bedstead which stood in the room. Even a worse case was discovered at a school at 24, Freeman Street, Spitalfields. In this overcrowded room, containing only 630 cubic feet of space, the sanitary officers found twenty-nine children all huddled together on the floor. The place was in a very offensive and improper condition, and the space for each child was only 21 cubic feet. The children in both these 'schools' appeared to be under five years of age, and to belong to Jewish families, and although the places were called 'schools,' the sanitary officers believed that the children were simply placed there by their parents to be taken care of during their absence at work during the day. Many of the children looked ill and delicate, as was to be expected. By order of the sanitary committee of the board and the medical officer of health, notices had been served upon the two 'dames' to abate the overcrowding, and compulsory orders were prepared and signed by the chairman of the board, so that the sanitary officers might be in a position to institute legal proceedings immediately, if such a step proved to be necessary.

'SANITARY INSPECTORS.'

WE publish a letter from a medical officer of health on this subject, objecting to the use of this title by inspectors of nuisances, as it tends to mislead the public as to the precise status of the officer, and is not warranted by the Public Health Act, 1875, or any other Act. He also objects to a self-constituted body holding examinations for inspectors of nuisances, as 'the lay element is in fact trying to push out the medical element in health work.' There is no doubt that the use of any name that tends to mislead the public is objectionable, but the sanitary needs of the country require that the inspector of nuisances should have some knowledge of his duties before being appointed, as it is quite time that the custom of appointing an ex-policeman or other pensioned official to the office should cease and determine. One of the weak spots in sanitary matters is the ignorance of many of the inspectors of nuisances, and anything which will assist in removing that ignorance will be for the public benefit. The idea that the inspector will supersede the medical officer can only apply to small districts, where the latter is in general practice, and cannot extend to large or combined districts where he has to devote his whole time to the work. Indeed, the elevation of the inspector of nuisances by a better status and proper education for his work, will have a tendency to reduce the number of medical officers of health, through the amalgamation of small districts. The general opinion of those who have paid most attention to sanitary matters, is that the appointment of efficient inspectors to a district of moderate size, and of certificated medical officers of health to an aggregation of these districts, with power over the inspectors, will lead to the best results. Medical officers should not be too sensitive in this matter, as they are protected in their position by the Act which renders the holding of a medical diploma essential to their appointment, and which virtually places them at the head of their department. If, however, the inspectors should refuse to carry out their orders, the matter would assume a different complexion, and the medical officers should take the necessary steps for asserting and maintaining their legitimate supremacy, which would doubtless in most cases be upheld by the local sanitary authority.

THE DESTRUCTION OF MEAT CONDEMNED IN THE CITY OF LONDON.

IN consequence of the great increase in the quantity of putrid meat seized in the city markets, a radical change in the mode of dealing with it has become necessary, so that the matter was referred to Dr. Saunders, the medical officer of health, who has dealt with it in a most practical and exhaustive manner. The difficulty of arranging for the rapid and satisfactory destruction of this meat may be estimated by the fact that on one occasion fifty tons of putrid American beef was seized in one day, and that the total quantity in 1874 amounted to nearly 194 tons, in 1875 to 153 tons, and in 1876 to 234 tons. Now as 35 tons of beef may be taken to represent, on an average, 100 carcases of oxen, the weight seized in 1876 would equal that of nearly 700 oxen.

Dr. Saunders considers the mode of dealing with it under six heads: first, when seized; second, its mode of conveyance to its place of destruction; third, where it should be deposited; fourth, the most economical process for its utilisation or destruction; fifth, the commercial value of the various parts; and, sixth, the value of the products after its reduction to fat, fibre, and bone. Under the first of these headings Dr. Saunders proposes to abandon the use of carbolic acid, and to substitute the immersion of the meat in a bath containing a solution of Cooper's salts (chiefly common salt and chloride of calcium), sulphate of iron, and picric acid, which would render the meat unsaleable without injuriously affecting the fibre for use as a manure, or the fat for making soap, etc., and considers that the meat so treated would realise from 6*d.* to 8*d.* per stone. In order to save time and expense, he proposes that waggons or carts should be constructed into which the solution and meat could be placed at once, instead of into a tank, so that with one waggon and two carts 16 tons of meat could be removed daily if two journeys were made.

In considering the best method for utilisation or destruction of the condemned meat, he discusses its treatment by steam at 300° Fahr. in an 'extractor,' and shows that each ton of meat should yield above 5 cwt. of fat, 2 cwt. of bone, and about 5½ cwt. of dried meat fibre, which could be used for manure or the making of prussiate of potash, etc. The value of the products of the seizures in 1876 would have been 2,222*l.* for the fibre, 1,071*l.* for the fat, and 119*l.* for the bones; but these sums would have to be debited with the cost of the plant, fuel, and labour necessary for reducing the meat to these constituents, and would, therefore, probably yield a smaller sum than the amount payable by a contractor at 6*d.* per stone, which would realise 1,365*l.*, without the trouble of superintending the process. It is, therefore, evident that, although the city authorities would not realise any profit on the transaction, yet the plan proposed seems a great improvement on that previously adopted, as it would obviate the objections made to the present method, as the carbolic acid renders the fat comparatively unsaleable, and the inhabitants of the neighbourhood complain of the offensive smell arising from the escape of steam mixed with organic matter and impure carbolic acid. As the Commissioners of Sewers should not enter on the business of manure manufacturers or of fat boilers, unless compelled to do so, it is most probable that they will sell the

meat by contract after it has been sufficiently immersed in the bath, which renders the flesh very dark-coloured and offensive to the taste (so that it cannot possibly be used for food), and thus satisfactorily solve one of the difficulties which from time to time arise in the sanitary administration of our great city.

Special Reports.

THE SOCIAL SCIENCE CONGRESS.

HEALTH DEPARTMENT.

IN this section, which was presided over by Mr. Edwin Chadwick, C.B., a paper was read by Dr. Hardwicke, the Coroner of Middlesex, on the mode of providing dwellings for the wage classes in large towns. He described a block of dwellings erected by a large manufacturer at Guise in France, called the 'Familistère,' which he described as having far superior arrangements, social and commercial as well as sanitary, to the workmen's dwellings lately constructed in the British Metropolis. These he criticised as being very defective in details, and susceptible of considerable improvement. As open spaces for the children of the wage classes he advocated the utilisation of the squares in the metropolis, and also the graveyards which, since the abolition of intramural interments, were kept in a most neglected condition. Mr. James H. Raper, of Manchester, advocated the extended provision of suburban self-contained cottages, owned by the wage classes who were occupiers. Mr. H. H. Collins, architect, expressed doubts as to the eligibility of too large constructions on the tall flat system which was now finding favour in London. The Chairman concurred in Dr. Hardwicke's criticism on the defects of the existing model dwellings, and expressed his conviction that further improved sanitary constructions might be obtained in concrete at one-third less of cost. The re-examination of those constructions he commended to those who were called upon to execute Mr. Cross's most important Act. A resolution was adopted recommending the Council to memorialise the Legislature for an extension of the existing law for providing open spaces for suburban populations.

Dr. Beveridge read a paper on the mortality of Aberdeen, setting forth the diseases chiefly affecting the different classes of artisans.

COMMON LODGING-HOUSES.

IN Colonel Henderson's annual report upon the Metropolitan Police Force for 1876, he states that during the past years but few matters of general interest have arisen in regard to common lodging-houses situated in the metropolis. The Acts therein are still enforced by the inspecting officers with energy and discretion, and it is gratifying to find that their exertions are rewarded by increased appreciation and regard on the part of those who make the registered common lodging-houses their homes, as the regulations are enforced for their well-being and comfort; 323 keepers have been served with notices to register their houses or parts of houses coming within the meaning of the Acts; 175 of these houses have been surveyed and measured, and a great many will no doubt be shortly brought forward for registration; 304 houses have been permanently registered and reopened; 138 of these are houses that have been re-measured and re-apportioned under the new scale of 300 cubic feet for each lodger; 124 houses have from various causes been closed and taken off the register; many of these will no doubt be re-registered; 3,876 houses casually used as common lodging-houses are under strict supervision, continuous visits being made by the inspecting officers to prevent sub-letting; 161 common lodging-houses are now under observation, and are being placed in compliance with the regulations, previous to their being registered; 37 summonses have been applied for against keepers of common lodging-houses for various offences, and convictions have resulted in each case.

Seven cases of nuisance have occurred on lodging-house premises, and have been dealt with by the Assistant-Commissioner (Captain Harris) as the local authority under the Nuisance Removal Act of 1855. The cases of contagious and infectious diseases will be found to be few in number when the epidemic of small-pox that has been raging in all quarters of the metropolis is taken into consideration. They are as follows: viz., three typhoid fever, one erysipelas, twenty-six small-pox, one scarlet fever, twenty-three continued fever, seven typhus fever, seven itch, ten measles; total, seventy-eight. Eighty-four deaths have occurred in common lodging-houses; of these seventy-two were sudden deaths. In addition, several other cases of illness have been dealt with, principally the result of privation and intemperance. The registered houses are steadily increasing and improving, and I may here remark that among the multifarious duties of the police, there cannot be a more legitimate one than that of supervising the cleanliness of these houses, and mitigating as far as possible the wretchedness and hardships which the poor endure, by an intervention directly conducive to the general security of the public.'

NORTHERN COUNTIES ASSOCIATION OF MEDICAL OFFICERS OF HEALTH.

IN the recent report of the annual meeting of this association (see SANITARY RECORD, July 5), notice of a demonstration of the use of the slide-rule in the preparation of vital statistics, etc., by Mr. J. M. Fox, M.O.H., was accidentally omitted. Mr. Fox explained to the association the method of using the rule, and showed the advantage to be derived therefrom by medical officers of health and others engaged in preparing statistics, calculating rates, cubic space, etc. In the course of the demonstration, Mr. Fox exhibited different forms of slide-rule, including that known as Everett's Proportion Table.

THE ST. PETERSBURGH WATERWORKS COMPANY.

THE directors of the St. Petersburgh Waterworks Company (Limited) have issued their report for the period from July 1, 1876, to July 12, 1877. This extra twelve days is added to suit the Russian calendar. They state that the income makes steady though slow progress, rising from 5,101 roubles in the first quarter to 8,388 roubles in the last. The total number of services laid is 331. At present the company's receipts are unfavourably affected by the fall of the exchange. According to the accounts, the capital expended on the works to date has been 265,257*l.*, and the debit balance on the profit and loss account is 10,169*l.* The current expenditure for the year odd at St. Petersburg was 8,589, and the gross income 5,174*l.*, showing a loss of 3,415*l.* This is not by any means a promising result.

Medical Officers' Reports.

HASTINGS.—The public health of this seaside resort was singularly good during the last quarter, as the annual death-rate was as low as 16·8 per 1,000, whilst the birth-rate was 28·8. Mr. Ashenden also reports that no death had been registered during the quarter, or in the corresponding quarter last year, from small-pox, measles, or scarlet fever, although a few cases had been trea ed in their own homes, or in the sanatorium. Several houses had been inspected, and orders issued for the removal of the nuisances found, which were complied with without any legal proceedings having been taken.

BIRKENHEAD AND CLAUGHTON-CUM-GRANGE.—The population is estimated at 55,500. The birth-rate was

42·84 in 1874, but was only 36·91 in 1876, and the annual death-rate was 18·61, against 21·56 for ten years, so that it is probable that the population is over-estimated. The death-rate given is lower than the true number, as the 70 deaths in the union workhouse and hospital, which are outside the district, are not included, so that it was 20 per 1,000 population in 1876. There were 4·48 deaths per 1,000 living from zymotic diseases, 2·81 from constitutional, 7·53 from local, and 2·59 from developmental diseases, all of which are below the average of 10 years. Twenty cases of small-pox were brought under the notice of the sanitary authority, and occurred at considerable intervals in different parts of the town, so that Dr. Vacher considers that if there had not been a hospital for these cases, there would most probably have been a severe epidemic. The arrangements by the sanitary authority are open to criticism, as they only receive patients who can pay 14*s.* per week. Indeed, the medical officer, in common with most others, considers that such a restriction as this acts unfair towards the community. The removal of nuisances seems to be well attended to, and the markets well looked after.

KENSINGTON.—Dr. Dudfield in his last monthly report refers to the prevalence of diarrhœa in his district, and to the number of deaths of infants from this cause. He attributes the disease, as most medical officers of health do, chiefly to bad water, sour milk, ill-prepared or unsuitable farinaceous food, and possibly the direct influence of heat, rather than to the bad sanitary condition of the dwellings. We suppose these cases were not endemic in certain localities, as in that case they probably depended to a certain extent on bad drainage or paving, that is to say, on emanations from decomposing organic matter. He also refers to several deaths of unvaccinated children from small-pox, and exempts the vaccination officer from blame; also to an instance in which eleven out of twenty-two inmates of one house were attacked with small-pox, and four died.

Law Reports.

ALLEGED POISONING OF A SHIP'S CREW.

R. COCHRANE, master of the *Crown Prince*, was charged at Glasgow Court with culpable homicide and neglect of duty by supplying his crew with putrid pork. Six men died from what was alleged to be blood poisoning. For the defence it was maintained that the symptoms of the men's illness were attributable to arsenic, which had become mixed in the sugar. Evidence in support of this theory was given by Professor M'Lagan, of Edinburgh, and the accused was accordingly acquitted.

REFUSAL TO ALLOW VACCINE MATTER TO BE TAKEN.

A. ARCHER was summoned before Mr. D'Eyncourt for refusing to permit the public vaccinator to take lymph from the arm of his child. Mr. Miller, the clerk to the Chelsea board of guardians, appeared to support the summons, which the defendant's wife answered to. Dr. Rowland, the public vaccinator gave evidence in effect that the child was duly vaccinated, and that when the child's arm was fit for lymph to be taken, Mrs. Archer refused to permit him to touch it. Mrs. Archer said the doctor laid hold of her roughly, and she refused to permit the operation, because the child had only just got over the chicken-pock. She did not allow it for the sake of other mothers who had children there. Dr. Rowland denied this, and asserted that all the woman said was that the child had had the whooping-cough. Had it had recent chicken-pock it would not have been susceptible of vaccination. Besides, he, by the Act, was the judge whether it was a fit arm to take lymph from, and not the mother. Mr. D'Eyncourt said the Act must be enforced; he should fine the defendant 5*s.* and 2*s.* costs.

SMALL-POX.

D. DALTON, of 769, Old Kent Road, mason, was charged on a warrant for disobedience for not cleansing and disinfecting his house after a case of small-pox had occurred in it. Fisher, the sanitary inspector, had served a summons, and the place had not been disinfected for some days. The defendant said he had been in the country attending a funeral. His wife was ill, and he had the place disinfected as soon as he could. Mr. Ellison imposed a penalty of 5*s.* for not disinfecting the premises, and 6*d.* for each day's delay, and costs.

ADULTERATING BEER.

AN innkeeper of Boscastle, named Forward, was summoned for selling six quarts of adulterated beer. Mr. Shurton stated that on July 26 he called at the Ship Inn, Boscastle, kept by Forward, and purchased six quarts of beer, which he divided into three parts, one part he left with defendant, one part he kept himself, and the other was sealed and sent to the county analyst, who certified as follows: 'I am of opinion that it has been adulterated with 150 grains of common salt per gallon. I also find distinct indications of *picrotoxin*, the active principle of *cocculus indicus*.' The analyst added, 'The salt is evidently used to promote thirst; the *cocculus indicus* may have been added as a preventive, but it is a most injurious drug, specially proscribed by the Legislature. It increases the intoxicating qualities of the beer.' The defendant said he put a little salt in the beer, and believed it was done by all brewers, but it was no profit to him, and was done simply to preserve the beer. He would swear that not a particle of anything else had been put in by him. The chairman told him that he had been guilty of a grave offence, but as they knew that his was a well-kept and respectable house, and that the salt might have been put in in ignorance, they would mitigate the fine to 1*l.* and expenses.

INFECTION IN A SHOP.

A QUESTION of great importance is involved in a case which recently came before the Manchester police-court. A provision dealer was summoned for selling provisions which had been exposed to infection from small-pox. The prosecution was undertaken by the corporation under the Public Health Act, which provides, 'that any person who sells any bedding, clothing, rags, or any other article that has been exposed to infection from any contagious disease, shall be liable to a penalty not exceeding 5*l.*' The defendant, who occupies a shop, had in his house two persons recovering from small-pox. These persons lived in the kitchen on the same floor as the shop, and the defendant was in the habit of going backwards and forwards from the kitchen to the shop. Anything more likely to spread contagion can scarcely be imagined, and it was stated that, in fact, small-pox had been communicated to the residents in a neighbouring house through the sale of provisions from the defendant's shop. The defendant, when visited by an inspector, alleged as an excuse for taking no precautions that the doctor had told him that they were only suffering from measles. The magistrate thought that if this statement was correct the defendant could not be prosecuted, and ultimately adjourned the case to hear the explanation of the doctor. Measles is, however, a contagious disease, like small-pox, although it is of a less serious character.

MEAT OF ANIMALS KILLED BY LIGHTNING.

AT the Clay Cross Petty Sessions, A. Herriett, butcher, was charged by Mr. E. F. Hall, officer of the Clay Lane local board, with exposing for sale in the market, seventeen pieces of meat, weighing 214½ lbs., totally unfit for human food. He at once sent for the medical officer of health, who condemned it, and it was taken before Mr. C. Bions, J.P., who ordered it to be destroyed. Dr. Mackintosh said he carefully examined the meat, and found it flabby and soft, the fat particularly so. Some of it showed a

deep purple tint, and there came from it an unnatural odour; in fact, decomposition had gone so far in the head, heart, lungs, and other parts that putrefaction had set in, and pus or matter could be observed in the ventricles of the heart, cellular structure of the lungs, in the head, and other parts. These indications pointed to the unwholesome condition of the meat, and he was of opinion that it was entirely unfit for human food. The fact that the animal was killed by lightning would favour putrefaction, for the blood would be diffused among the tissues. If used for food it would very likely cause vomiting, purging, cramp, and other alarming symptoms. Dr. Bland, veterinary surgeon, of Alfreton, said he had cautioned the owner of the beasts, or his agents, against selling them for human food. He had not seen them, but the parties told him that they had died from lightning. Samuel Allsop said that on September 16 he had two cows killed by lightning, and sold them to the defendant for 11*l.* 17*s.* 6*d.*, on the condition that defendant took all the risk. The beasts were worth, if healthy, 36*l.* Defendant knew the cause of death. The bench were unanimous in fining the defendant 10*l.*, and 6*l.* 7*s.* costs, or two months' imprisonment. He was locked up.

ADULTERATION OF GIN.

W. FAWCETT, landlord of the Masons' Arms, Northallerton, was summoned for having sold half a pint of gin, which was not of the nature, substance, and quality of the article of food demanded. Superintendent Walmsley stated that he, as inspector under the Food and Drugs Act, called at the defendant's house, and purchased half a pint of gin. He said at the time that he wanted it for analysis, and offered to leave one-third. One-third he (witness) retained, and the remaining third he forwarded to Mr. Fairlie, the county analyst. A certificate from him stated that of water there was 48·42 per cent., proof spirit 51·53, and of flavouring materials 5. The gin was therefore 48 under proof. Mr. Walmsley added that from inquiries he believed that gin was ordinarily sold from 17 to 22 under proof. Mr. James maintained that there was no evidence to show that the gin was not in the same state when sold by the defendant as it was when received from the distillery. No evidence had been brought forward to prove that water was added by defendant, or that any attempt was made to deceive Mr. Walmsley when he purchased the gin. It was not guaranteed to be pure gin; in fact, if innkeepers sold pure gin they would shorten the lives of their customers. Mr. James also submitted that gin or any spirit might lose strength in transit. The Bench considered the case proved, and the chairman remarked that although there had been an attempt to deceive the public, as this was the first offence they would only inflict a fine of 5*s.* and costs.—R. Garnett, New Inn, Northallerton, was summoned under a similar information. Mr. Walmsley, as in the former case, told the defendant's wife he wanted the gin for analysis, when she replied, 'Well, we do add a little water to it, else we could not sell it at the price we do.' Witness added that he had not then paid for the gin, and Mr. James then submitted that no offence had been committed within the meaning of the statute, as before the actual purchase, Mr. Walmsley had had notice given him that the gin was mixed with water. Mr. Brown remarked that purchase might be made before payment. Mr. James contended that as he had notice that it was a mixture of gin and water, it could not be said it had been sold to the prejudice of the purchaser. Mr. Brown: It is too late to pretend to be honest when you are found out. The Bench inflicted a fine of 5*s.* and costs, Mr. Brown observing that the custom was practically as bad as thieving.

THE St. Columb Board of Guardians have appointed Mr. Clemon, of St. Merryn, inspector of nuisances for the rural sanitary district of the St. Columb Major union at a salary of 50*l.*

Legal Notes and Queries.

OVERCROWDING.

SIR,—Will you kindly help me to a practical solution to one difficulty which often besets me when inspecting the dwellings of the poor in a district? I refer to the subject of overcrowding. I go to a house and I find each room perhaps inhabited by a separate family, say of four individuals. I turn to the medical officer of health on such an occasion, and say, 'This ought not to be; you should in some way prevent this. Six people in one small room is dangerous to health.' I receive the invariable reply, 'I have no legal power to interfere unless infectious disease is present.' I urge them to summons the landlord for creating a nuisance dangerous to health, but without success. As I have been unable to find any legal enactment to meet such cases satisfactorily, will you kindly put me right on the point. If there is no Act, Torrens' Act seems to me to practically apply. Will you kindly give me any practical suggestions as to what course it is possible to take, and also as to any new clause which might be urged on the Government for adoption? I desire to prepare some practical suggestions as to a remedy, for the existing condition of the poor at present is certainly more often than not truly horrible.

B.

[The question of overcrowding is, as our correspondent points out, one of very serious importance, but it is not so absolutely difficult as he seems to imply. The answer which he says he invariably receives from medical officers of health appears to us altogether illusory. The section of the Public Health Act which deals with overcrowding (§ 91) says nothing whatever about the presence of infectious disease being a condition precedent to interference with overcrowding. It simply provides that any house overcrowded so as to be dangerous or injurious to the health of the inmates is to be deemed a nuisance, and the offender will be punishable accordingly. The magistrates will decide on the evidence whether they think the available cubic space in a given room is or is not adequate and whether a nuisance within the meaning of the Act exists. —ED.]

CONNECTIONS WITH SEWERS.

THE parish of W. has been thoroughly sewered by the rural sanitary authority; most of the owners have connected their houses with the sewer; the few who refuse, have either cesspools from which the sewage soaks away, or their drains escape into the highway sewer (laid for storm waters only) which empties into the brook. Although there is no perceptible nuisance on the premises, has the local authority power under the Public Health Act to compel the owners to connect with the sewer, provided the house is within the required distance (section 23)? In some instances earth closets have been adopted, still the waste water from sinks, etc., finds its way into the road sewer. Without any enactment in force within the district requiring the construction of water-closets (section 37), can owners, if they think proper, put up earth closets without the approval of the local authority, and thus evade the liability of draining into the sewer. W. M. LOWICK.

[The points mentioned in this letter require to be carefully handled. Our correspondent has not stated his facts quite so fully as could be desired, but we are of opinion that section 23 of the Public Health Act, 1875, is applicable in conjunction, if needs be, with section 36, to which section 37 is an auxiliary enactment.—ED.]

WATER-SUPPLY.

SIR,—A village situate in the Rural Sanitary District of A. being without any public water-supply as defined by sec. 64 of the Public Health Act, 1875, the water used by the inhabitants is obtained from standpipes fixed at various points to mains laid by a coal company throughout about

300 houses owned by them on the west side of the village. There is about 300 other houses belonging to various owners, but partly let to the Company, and occupied by their workmen. The whole of the water consumed is obtained at present from the above source, except in cases where there is a well on the premises, and a few who filter the rain water for domestic use. Recently a water company has laid mains throughout the village, but the various owners refuse to take the water on the grounds that they are supplied from the stand pipes above referred to. To strike an average, the latter 300 houses would be, at least, 150 yards distant from the nearest stand-pipe. Would you consider this a proper water-supply within the meaning of sec. 62, and could the sanitary authority under the powers vested in them by that section, compel the several owners to provide a supply, seeing that the existing one is not in conjunction with their own houses, but provided and maintained at the expense of the coal company, situate on their own property, and presumably intended for their own houses.

Your opinion in your next issue will oblige

September 17, 1877. A SUBSCRIBER.

[This is a rather difficult question to answer with confidence on the above statement. It is a question not so much of law as of evidence as to facts. We should incline to the opinion that the owners could *not* be compelled to take the company's water, but such a matter is of such serious importance as to justify an application to the magistrate even at the risk of failure to make out a sufficient case for their interference.—ED.]

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

LOCAL BOARDS AND LODGING-HOUSES.

(*To the Editor of the* SANITARY RECORD.)

SIR,—The subject of drains and drain ventilation is becoming more and more one of importance. Private householders in many places are doing much in this respect. I would try in this letter to point out the necessity of the local boards insisting on the usual sanitary precautions being carried out in lodging-houses before they are let as lodgings to unwary travellers.

My experience tells me that the subject of ventilation of soil-pipes and of drains is one of which the lodging-house keeper is entirely innocent; if there is an unmistakable smell we are merely told that there 'must be something wrong with the drains,' but that it should be disgraceful in 1877 for a householder to allow of a smell being able to make its way from the drains into his house never seems to enter his head. This applies naturally more to a seaside watering-place, where in most cases the sewage is carried out to sea; but the same argument holds good inland. I was at C—— S—— this summer, where an entirely new system of drainage was being laid down. As far as I could see no steps were taken anywhere for the ventilation of these drains; the lengths of glazed pipes were well fitted into one another, and no one seemed to have the slightest conception that the sewage in these hermetically sealed drains would generate sewer gas and impure air which in the case of any sudden storm or rush of water through the drains, must be forced back into the houses. I need not add that the object of a ventilating pipe from the top of the soil-pipe through the roof seemed quite unknown to the inhabitants of the place.

A short time after I was at B——. From the nature of the ground the roofs of the houses can easily be seen. The place consists almost entirely of hotels and lodging-houses. Here houses are being built in every direction, but not a sign of a ventilating pipe anywhere. The subject was uncomfortably forced upon me here a few days after our arrival. There was a terrible smell of drains throughout the houses; it was really insupportable. We were told that 'there was something wrong in the drains.' There was a closet downstairs, into which even the servants would not go, although there was a rumour through the house that the smell came just as much from the housemaid's closet upstairs as from the closet downstairs. The following turned out to be the facts of the case: Somewhere outside the house, there was a stoppage in the drain. Workmen were set to work about 100 yards in front of the house; they there opened the drain, and passed long rods up the drain to clear the obstruction. A gale of wind was blowing from the direction in which they were working, which naturally drove up the impure air; and as the first outlet it could find was probably the pipe from the housemaid's closet, we can easily understand how the rumour above mentioned was very likely quite correct. I have since reason for knowing that a lady and her daughter both left B—— in a hurry with bad sore throats; might not the drains have had something to say to them?

I afterwards went on to L——, a seaside watering-place; not a vestige of any ventilating pipes, and, although I never again met with such a disgraceful state of things as I have just described, yet there seems to be a kind of smell which is indigenous in lodging-houses, especially by the sea. It would seem to be a mixture of smells from cooking, from drains, and from chloride of lime, and to my mind the smell from the drains varies according as to whether the state of the weather is still or boisterous, also perhaps according to the ebb or flow of the tide. Might not all this be obviated by ventilation of soil-pipes and drains? With reference to this place, I may mention that, to my knowledge, a young child, a few months old, died a few days after leaving it. Its death was attributed to one of the many diseases which are common among babies; still, there was a suspicion that its death was accelerated, if not caused, by having breathed impure air. It may have done this at L—— or elsewhere, yet would it not have been a comfort to the parents if they could be certain that before they took the lodgings their healthiness was certified by the local board, and that under the word 'Apartments' they had been able to read, 'Drains and soil-pipes ventilated'?

I may mention another instance which occurred at a seaside watering-place. A lady and one or two children went to a lodging-house. She was delicate. Shortly after she was seized with a bad malignant sore throat. The children were sent elsewhere. The doctor was sent for; he plainly stated that as long as she stayed in that house she would never get well. She moved to another house and recovered. Before the next winter the house was fresh painted, done up, its name altered, and of course let in lodgings the next season. Is it not incumbent on local boards to see that these houses are properly drained and ventilated before they are advertised to unwary travellers with the usual card 'Apartments'?

The radical fault of the whole question is this: local boards and lodging-house proprietors seem to fancy that sewers, drains, and soil-pipes contain a certain amount of sewage (of course) and air; they seem to forget that this air degenerates into sewer-gas; and that instead of reading 'sewage and air' we should read 'sewage and sewer-gas.'

2. Another fact, which is often overlooked, is that any rush of water, such as a sudden heavy shower, or even the emptying of the baths down the closet (supposed generally to be a most easy way of flushing the drains) dislodges a certain amount of this air or gas, and that unless a ready means of escape is made for it it must come back into the house. The same argument holds good as to the pressure of the incoming tide at seaside places.

To my mind there are four things which are absolutely necessary to obviate these evils:

1st. The local boards should inspect and give a certificate to every house which is to be used as a lodging-house.

2nd. That in these houses, the soil-pipes should be ventilated.

3rd. That the drains should be ventilated outside the house.

4th. That the pipes from the housemaid's closet, and from the scullery should not communicate with the drains.

No. 1 stands to reason; as it is now, a lady with a young family goes into any lodging-house, and takes rooms, quite unconscious as to whether there has not been a recent case of malignant disease in it.

As to No. 2. A 2½-inch or 3-inch pipe should be fixed to the top of the soil-pipe of the uppermost closet, and carried through the roof to some few feet above it, probably alongside some chimney stack; the reason is obvious.

As to No. 3. Beyond the most outside trap in the drain from the house, the drain should be tapped, and an iron pipe carried horizontally to the nearest wall of the building, then run up outside it, and be carried through the roof to a few feet above it. The reason of this is, that should there be any undue pressure put on the impure air in the drain, it would escape into the open air, instead of being forced into the house.

As to No. 4. The pipes from the housemaid's closet, and from the scullery should be carried through the wall, then down outside it, to within six inches of the ground; the water would then fall into a grating, and through a bell trap into the drain; with regard to the scullery this is now often the case, with regard to the housemaid's closet, I may say never.

The government should give local boards the necessary authority for No. 1, and should insist on the Nos. 2, 3, and 4 being carried out by them. The number of water-closets in a lodging-house for the convenience of the number of occupants should also be attended to; at present they are quite inadequate, and should any fault occur in one, the consequences are not only inconvenient but unhealthy as well. Even in London I would ask how many hotels and lodging-houses have their soil-pipes ventilated, to say nothing of the drains and the pipes from the scullery and housemaids closets?

The ventilating of sewers should be also strictly attended to by local boards, especially at places where a new system of drainage is being introduced; this is easily done by the sewers being tapped at certain distances, horizontal pipes carried to the nearest house, and then up along its wall, through the roof and above it. How often in towns do we hear of epidemics running along certain streets and remaining in certain localities? Might not this be easily attributed to the non-ventilation of the sewers and drains?

At a place where new sewers are being laid down the following was said by a medical member of the local board; he 'observed that sewers could not be had without gas, which always had a tendency to fly off to the highest point, and he was anxious to meet this, as it would otherwise be injurious to health.' A great many of our watering-places are built in terraces with continuous drains. The idea of the sewer gas 'having a tendency' to fly upwards must be a comfort to those living in the higher situations.

The subject is one which might be extended to any length, but it is one which must before long attract the attention of Government. The supposed exigencies of modern civilisation require closed sewers, drains, and pipes of all kinds; in these impure air and noxious gases must accumulate. Building is going on everywhere at a most rapid rate. Surely it is only a self-evident fact that the local boards of watering-places should be able to prevent any house being let in lodgings without a license, and that no such license should be granted until the medical officer of the board could report—1. That the soil-pipes were ventilated; 2. That the drains were also ventilated; 3. That the pipes from the house-maid's closet and the scullery did not communicate with the drains.

We might then go to any watering-place in comfort, instead of at present with an unhappy feeling that we may be inhaling the germs of disease, if not of death, where we ought to be enjoying our leisure and recruiting our health.

I may, perhaps, now turn to the means of carrying out the steps which I advocate. In houses now being built, the local boards ought to get a certificate from the builders that the above precautions have been attended to. While the house is being built, nothing is easier; in houses already built it may be more difficult; but in the case of lodging-houses, which is the case to which I mostly refer, no very great difficulty need exist. Most of these houses are either detached or semi-detached, or, when in a row (as a rule), the water-closets project from the back and the main drain runs down in front of the terrace or row. A pipe can easily be attached to the top of the soil-pipe and carried up alongside the wall of the house through the roof, as I have before described, and nothing can be easier, as I have had done myself, than to carry a length of iron pipe from the drain under the foot pavement to the wall, and then several of these lengths can be put up in a few hours and carried through the roof. In my own case the drain was tapped in the morning, and the whole pipe was fixed before midday. The pipe is afterwards painted the same colour as the house.

Some persons fancy that in a gale of wind the wind would blow down these pipes and drive the impure air into their houses. They need not be afraid, as the air inside the pipe and the air inside the drain would both be ventilated; but a small cap over the top (which I believe to be quite unnecessary), would prevent anything of this kind happening.

It should be borne in mind that the sewage in a drain moves along at a certain pace, far faster than most people have any idea of: why then should the air in connection with this moving mass be allowed to get impure and noxious by being kept in hermetically sealed drains and pipes? Let these pipes, drains, and sewers be well ventilated and I feel confident that our general health not only at 'Watering-places,' but also in our own houses, would be far better than it is at present. J. R. T.

DRAINAGE INTO THE SEA.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Living in this remote part of the world, and not having access to information that would be readily obtainable in the old country, I trust you will pardon my seeking the knowledge I require through the medium of your very valuable journal.

The point I seek to obtain information on is the effect of sewerage delivered into the open sea at a reasonable distance beyond low water mark—say half-a-mile off. Is there any danger of silting up of the sewerage, or is there any fear of its return to the fore-shore? or any danger of its becoming a nuisance or detrimental to the public health? Probably some of your readers can furnish important facts, bearing on the above subject, from their own experience. My inquiry has a practical tendency, as relating to the drainage of the city in which I now reside, viz., the City of Adelaide, the capital of the province of South Australia, with a population of about 31,000 inhabitants, and rapidly increasing. The city itself is situated on a plateau, the southern portion about a mile square, the northern portion somewhat less, with a river (as it is called), but rather a deep ravine, caused by torrents from the hills, in the wet season. The highest elevation of this flat above the sea-level at low-water mark is about 170 feet, and the lowest about 130 feet; the distance to the shore of Gulf St. Vincent in a straight line is about five miles—the fall gradually sloping from the city to the shore. Gulf St. Vincent is an estuary of the Great Southern Ocean (about forty miles wide opposite the proposed outlet of the sewer) with Kangaroo Island acting as a partial breakwater at its mouth—the gulf communicating with the ocean, on the west by Investigator Straits, and on the east by Backstairs Passage. The gulf lies nearly due north and south, and the tide flows regularly up and down and not inshore, and has a minimum rise and fall of eight feet.

The bottom of the coast where it is proposed to take the outlet of the sewer to, is sandy and even, with grassy patches, and not seaweed—no uneven surface for collecting any deposit. The sea in the gulf is sometimes so rough that communication between ships anchored in the offing and the shore is difficult in ordinary boats. A supply of water for flushing the drains would not be difficult to obtain, should such be ever necessary; this, however, would probably not be required, as the subsoil on which the city is built is of a stiff whitish clay, almost if not completely impervious to water, and thus retains a large quantity of brackish water, that it is desirable to drain off, so as to render cellars and underground rooms available; moreover there is an abundance of beautiful water for drinking and all domestic purposes supplied on the constant principle, at the rate of one million of gallons per diem. The city of Adelaide is immediately surrounded by Parklands—and beyond these suburban villages are rapidly increasing.

These, if a plan of sewerage could be safely carried out, would be able to avail themselves of the same system. One important matter connected with the sewage passing into the sea is the fear of its rendering the coast line, in any way unfit for marine residences.

I have not the means of ascertaining how such places as Brighton, Hastings, Broadstairs, Scarborough, Dover, and other similar ones, are drained, and the particular system adopted. Nor do I know the effects the sewerage has on the shore line, or as to whether any injurious consequences result to the inhabitants of these places—hence my troubling you with this communication.

WILLIAM GOSSE, M.D., etc.,
President of the Central Board of Health
for the Province of South Australia.
North Terrace, Adelaide, S.A., August 9, 1877.

'SEWER GAS.'

(*To the Editor of the* SANITARY RECORD.)

SIR,—I have read the remarks by Mr. R. Barnes Austin, C.E., as given at pp. 184-186 of your columns upon this subject, but, so far as I can judge, he commits not a few mistakes.

1. In speaking of soil-pipes, he says the air in the down-cast shaft merely balances itself with that in the up-cast.

2. He asserts that the placing of a ventilating cowl upon the top of a soil-pipe with an air inlet at the bottom prevents the formation of any 'sewer' (sewage?) gas within said soil-pipe.

3. He says the Banner system is less expensive than any existing system.

4. By adopting the Banner system (which according to the patent means the abolition of all siphon traps at water-closets, baths, sinks, or bedroom basins) perfect immunity from sewer (sewage?) gas is ensured.

5. And lastly, identifying himself with the Banner system, he says, 'We have no weak part.' Now I beg leave to reply to the foregoing statements *seriatim*.

1. The column of air in the soil-pipe or up-cast shaft is lighter than one of equal height in the down-cast, because the first is sewage gas and the latter is comparatively pure air and generally colder. Consequently when—as was often done years before Mr. Banner's time—the soil-pipe was ventilated by a simple air-pipe, open above the roof, the rain water pipe acted as the down-cast shaft and a strong constant current went up through the soil-pipe or up-cast shaft. This will enable Mr. Austin to understand how a soil-pipe was and can be ventilated without an air inlet at the bottom.

2. In reply to the second, I need only quote the following, kindly forwarded to me by the spirit of the late Thomas Moore,

'You may flush, you may vent'late the pipe if you will,
But the scent of the fæces will hang round it still.'

3. Mr. Banner's one trap at the bottom of soil-pipe costs 3*l.* 5*s.*, but taking a soil-pipe with, say three water-closets upon it, then with three 4½ in. lead siphon traps, and a 6 in. fire clay ventilating trap at 8*s.* each, we have a balance of 35*s.* against Mr. Banner's system, plus 6*s.* 6*d.* for three lead bends required by the Banner system in lieu of the traps; so that gives 2*l.* 1*s.* 6*d.* extra against the Banner style.

4. Not only is '*perfect* immunity' not secured, but the Banner plan of discharging the hot water from the bath into the water-closet soil-pipe is one perfect way of quickly manufacturing sewage-gas, and the further plan of connecting bedroom basins into this artificially-heated-up soil-pipe is another perfect way of breeding typhoid and other fevers.

5. 'We have no weak parts' says Mr. Austin. That reminds me of Nelson being unable to see the signal at the battle of the Baltic. Some 'weak parts' have been already alluded to, another is the trap used at each water-closet (although we are told no traps are used), viz., the pan at the basin, which being movable and intended to be emptied each time the closet is used is liable to be untrapped whenever the water happens to be off, or when the pan leaks. To provide against these defects is part of the use of a lead siphon-trap below each closet. With said siphon-trap in a closet, it is like a steam boiler with a safety-valve upon it; without trap or valve, closet or boiler are more liable to cause danger or explosion. At page 403 of your issue for June 22, 1877, I find Mr. Banner, in his reply to Mr. Turner, equally unconscious of any weak parts in his system. Mr. Banner states that his cowl-turning is of no more consequence than if Mr. Turner were turning round himself. That is a mistake, however, for in order to turn the cowl has a joint, and it is somewhat weak there, as, owing to this joint being open, the cowl draws fresh air into it within a foot of its motive power, which is highly prejudicial to its action in withdrawing the foul air; further, should the joint get stiff the whole system is a failure. I might mention other weak parts,* but enough has been said to show the absurdity of using the term 'perfect' in the way in which it has been used. Mr. Banner undoubtedly deserves praise for much that he has done, but there is a medium in everything, and Mr. Austin should strive to keep within that.

W. D. BUCHAN, Sanitary Engineer.
124A Renfield Street, Glasgow,
September 22, 1877.

'SANITARY INSPECTORS.'

(*To the Editor of the* SANITARY RECORD.)

SIR,—More than one medical officer of health has complained of the very unsatisfactory relative position of such officials and inspectors of nuisances. These individuals can in a quiet way, if so disposed, almost entirely ignore the health officer, and the title assumed by them now of 'sanitary inspector'—one not warranted by the Act of 1875—is working much mischief. I have knowledge of the fact that the lay public often consider the 'sanitary inspector' is a higher authority than the 'health inspector,' as they often term the health officer. I have seen letters addressed '*Mr.* So-and-So, Officer of Health,' and 'So-and-So, *Esq.*, Sanitary Inspector' to the inspector of nuisances.

There is now a prospect of matters getting still worse. A self-constituted body, to hold its meeting shortly at Leamington, is about to institute 'examinations' for inspectors of nuisances. The lay element is, in fact, trying to push out the medical element in health work. Already 'sanitary engineers' and 'sanitary surveyors' aim at many functions requiring medical knowledge, and if the 'cant' about the 'growing importance' of the inspector of nuisances is encouraged, it will soon be found that 'sanitary inspectors' will place health officers in a very false position. I decline to permit my inspectors of nuisances

* By the way, Mr. Banner's patent was not the earliest in date which included an air inlet at the foot of the soil-pipe in conjunction with a ventilator upon the top; that, however, has no bearing upon its practical working.

to assume the title, and personally I am no sufferer; but I see the evil and hear complaints from all sides.

MEDICAL OFFICER OF HEALTH.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

ALSOP, Mr. George, has been re-appointed Inspector of Nuisances for the Mansfield Rural Sanitary District at 100*l.* per ann. for two years.

BALY, Joseph Sugar, M.R.C.S. Eng., L.S.A. Lond., has been re-appointed Medical Officer of Health for the Leamington Urban Sanitary District for three years.

COGAN, Lee Fyson, L.R.C.P. Edin., M.R.C.S. Eng., has been re-appointed Medical Officer of Health for the Northampton Urban Sanitary District.

COOMBE, Mr. William, has been reappointed Inspector of Nuisances for the Launceston Rural Sanitary District at 35*l.* per ann.

COUSINS, John Sims, L.R.C.P. Edin., L.R.C.S. Edin., L.S.A. Lond., has been reappointed Medical Officer of Health for the Llanvrechva Upper Urban Sanitary District, Monmouthshire, till June 24 next.

FIELDEN, Samuel, L.R.C.P. Edin., M.R.C.S. Eng., has been appointed Medical Officer of Health for the Shildon and East Thickley Urban Sanitary District.

GREEN, Mr. John, has been appointed Inspector of Nuisances for the Ellesmere Rural Sanitary District, vice Cooley, resigned.

LATUS, Mr. John Sawyer, has been appointed Inspector of Nuisances for the Driffield Urban Sanitary District at 50*l.* per ann.

MANBY, Frederick Edward, F.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the Cannock Rural Sanitary District, vice MacCully, whose appointment has expired, at 100*l.* for one year.

MAY, Mr. John, has been appointed Surveyor to the Ellesmere Local Board and Urban Sanitary Authority, vice Cooley, resigned.

PARKER, Charles Gunning, F.R.C.S. Eng., has been appointed Medical Officer of Health for the Shrivenham Sub-District of the Faringdon Rural Sanitary District, vice Barrett, resigned.

PROUD, Mr. John T., has been appointed Clerk to the Shildon and East Thickley Local Board and Urban Sanitary Authority.

PULLIN, Thomas Henry Stocker, M.D. Univ. St. And., M.R.C.S. Eng., L.S.A. Lond., has been reappointed Medical Officer of Health for the Sidmouth Urban Sanitary District at 25*l.* per ann. for three years.

STEELE, Sidney Thomas, L.R.C.P. Edin., and L.M., M.R.C.S. Eng., has been appointed Medical Officer of Health for the Morley Urban Sanitary District, Yorkshire, till December 31.

SYKES, Walter John, M.D., C.M. Univ. Edin., has been appointed Medical Officer of Health for the Liversedge Urban Sanitary District at 40*l.* for one year.

THOMAS, John, M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the No. 1 Sub-District of the Cardigan Rural Sanitary District till March, 1878, vice Noott, resigned.

THOMSON, John Anstruther Mulville, L.K.Q.C.P. Irel., and L.M., L.R.C.S. Irel., has been appointed Certifying Factory Surgeon for the District of Newport, Salop.

WAINWRIGHT, Mr. J. Harley, has been appointed Inspector of Nuisances for the Llanvrechva Upper Urban Sanitary District, vice Morgan, resigned.

WIGMORE, Mr. Edward, has been appointed Clerk and Collector to the Driffield Local Board and Urban Sanitary Authority at 100*l.* per ann.

WILLIAMS, Frederick, M.R.C.S. Eng., L.S.A. Lond., has been re-appointed Medical Officer of Health for the Launceston Rural Sanitary District, and his salary increased from 30*l.* to 50*l.* per ann.

VACANCIES.

BRECON RURAL SANITARY DISTRICT. Inspector of Nuisances: 120*l.* per ann.

KIRKHAM URBAN SANITARY DISTRICT, Lancashire. Inspector of Nuisances: 20*l.* per ann. Application, October 1, to W. J. Dickson, Clerk to the Authority.

KIRKLEATHAM LOCAL BOARD AND URBAN SANITARY AUTHORITY, Yorkshire. Surveyor and Inspector of Nuisances: 80*l.* and 40*l.* per ann. Application, October 1, to M. B. Dodds, Clerk.

LICHFIELD RURAL SANITARY DISTRICT. Inspector of Nuisances.

OVER DARWEN URBAN SANITARY DISTRICT, Lancashire. Medical Officer of Health: 120*l.* per ann. for three years. Application, October 1, to Charles Costeker, Law Clerk.

PENZANCE URBAN SANITARY DISTRICT. Medical Officer of Health.

RADNORSHIRE. Public Analyst: 21*s.* per analysis, and travelling expenses when required to attend and give evidence. Application, October 3, to William Stephens, Clerk to the Peace, Shire Hall, Presteign.

SHEFFIELD. Certifying Factory Surgeon.

SWINTON AND PENDLEBURY LOCAL BOARD AND URBAN SANITARY AUTHORITY, Lancashire. Surveyor. Application, October 1, to W. J. Hewetson, Clerk.

UPHOLLAND LOCAL BOARD AND URBAN SANITARY AUTHORITY, Lancashire. Surveyor, Inspector of Nuisances, and Collector: 120*l.* per ann. Application, October 3, to W. Berridge, Clerk.

OPEN COMPETITIONS AND CONTRACTS FOR SANITARY WORK.

MANCHESTER.—Sept. 26.—Designs are required for proposed bat and wash-houses, to be erected by the corporation. Premiums of 200*l.*, 100*l.*, and 50*l.*—Sir J. Heron, Town Clerk, Town Hall, Manchester.

DROITWICH.—Sept. 22.—For construction of works in connection with the water supply.—Mr. E. Pritchard, C.E., 21 Church Street, Warwick.

GREENWICH.—Sept. 26.—For construction of brick and pipe sewers.—Mr. J. Spencer, clerk to the Board of Works, Greenwich.

BRISTOL.—The directors of the Waterworks Company desire to receive tenders for the erection of engine and boiler houses and other works required at their pumping station at Chelvey, about nine miles west of Bristol. Drawings, etc., may be seen at the company's offices, Small Street, Bristol, or at the office of John Taylor, Esq., the company's consulting engineer, 27 Great George Street, Westminster, London. Tenders to be delivered at the offices, Small Street, Bristol, Sept. 29.

NOTTINGHAM.—The Sewerage Board are prepared to receive tenders for the execution of the outfall sewer works from Nottingham and Sneinton to Stoke Meadows, in the parish of Gedling, and for the supply of iron pipes in connection therewith. Plans, etc., may be seen at my offices.—M. Ogle Tarbotton, engineer, Nottingham.

SANITARY PATENTS.

2846. An improved method of and apparatus for treating street refuse. William Edward Bovill, Dean's Yard, Westminster, London.

3038. Improvements in traps for sewers. George Lamb Scott, jun., Manchester.

3052. An improvement in ventilators or ventilating cowls. George Livermore Shorland, Manchester.

3096. Improvements in the manufacture of agents in the purification of sewage and for other purposes. George Fournier, Boulevart de Strasbourg, Paris.

3119. Improvements in ventilating apparatus to be applied to water-closets. David Gill, Weston-super-Mare, Somersetshire.

3120. Improvements in suspending seats, couches, and berths on shipboard for the prevention of sea-sickness. George Ovid Topham, Maida Vale, London.

3151. Improvements in treating the residuum or precipitate obtained in the purification of sewage. Joe Frost, Huddersfield.

3176. Improvements in stench traps as applied to sink pipes and similar purposes. Joseph Easby, Sheffield.

3212. A new or improved method of making up and combining soap or other cleansing matters with other materials to be used for washing and cleansing purposes, and in the means, machinery, and apparatus employed for this purpose. Richard George, Alma Street, Kentish Town, London.

ABSTRACTS OF SPECIFICATIONS.

25. Cleaning cisterns, etc. J. Thompson.

To the bottom is fixed a trap, with under portion a box for water, and connected on one side with the waste pipe to drain. The top part has a junction pipe for the standing waste to be secured to, which pipe is continued below the cover and dips in the water of the box. A plug valve in the cover can be raised by a wire pull, letting the contents run away through the waste pipe.

27. Testing milk. W. R. Lake.

Two circular glass plates are held parallel a little way apart by a small metal plate which halves their interval. On the inner side of one plate are crossed black lines, or words, which are looked at through a layer of milk in one half, and the degree of distinctness compared with the other half, in which is placed some substance resembling normal milk in colour and transparency.

103. Manure. H. Y. D. Scott.

'Pail Stuff' is passed through a sieve, and to the strained liquid is added phosphate of iron dissolved in mineral (sulphuric) acid, giving a precipitate fit for manure. When the liquid is without solids, ammoniacal acid is used without phosphate. The higher carbonates of ammonia are next distilled from the liquid, and caught in cool receivers, where the salts crystallise. The rest of the ammonia is recovered either by evaporation or distillation. Solid excreta are in one process deodorised with caustic alkali, and so much soluble phosphoric acid then added as to make the compound neutral or slightly acid. Again, fæcal matters are treated successively with gas liquor, superphosphate of lime (with heat), magnesia, and chloride of magnesia, and dolomitic lime.

108. Supplying water to closets, etc. S. Osmond.

This consists in combination of two cisterns, one within the other; in the inner the main supply of water is received, and from it water is drawn for drinking and other domestic purposes, this water being kept distinct from any connection with closet pipes and from the water to the outer cistern, which is used solely for sanitary purposes. The outer tank receives the overflow from the inner, and gives off its own overflow by the water pipe leading to the closet or drain.

193. Chimney tops and ventilators. H. Prentise.

The wind blowing against the chimney tops enters apertures in them, and is guided upwards by diaphragms, improving the draught. Any downward draught is diverted to one side or other through those apertures.

227. Water-closets. W. Pawson.
This consists in forming closet pans with a bellied part at bottom to hold water in bulk (the bottom leading to an inclined neck, which enters a vertical pipe leading to a siphon trap, and closed by a valve); again, in fitting a closet supply cistern alongside a closet pan, and making the inlet at the bottom of the pan, so that water shall rise in the pan to the required height, determined by the capacity of the supply cistern or the quantity supplied to it by self-closing mechanism, etc.

240. Trapping drains, etc. J. Harris.
This consists in combination with a bell-trap of a self-closing valve or water-joint made to act so as to shut-off the sewer gas from the trap.

242. Ventilating sashes. J. W. Grover.
This consists in hinging to the lower part of the frame a weather guard or air screen (for use when the window is opened), which can be moved to an inclined position inwards from the sash. It consists of a wooden frame with glass panel and flexible side cheeks, also a pring catch to fasten the lower sash with the screen.

243. Extinguishing fires. W. L. Wise.
In one arrangement, the hose is terminated by a nozzle in which are two injector cones, below which two pipes enter the nozzle from two reservoirs carried by the fireman, one containing bicarbonate of soda, the other an acid. Water entering the bicarbonate reservoir forms a solution. This and the acid are drawn into the nozzles, and there form CO_2, which mixes with the water.

250. Stench trap. P. Cardwell.
In a box is a vertical partition not reaching to the top. The grid is hinged to the top of the box, and on its under side a diaphragm slants down into the water in (say) the left compartment. Another diaphragm from the other side slants to the water surface. The water, etc., in this left compartment is in an inner metal receptacle, removable with a handle; and a lip on one side extends over the partition. The other compartment is connected at bottom by the usual siphon with the drain pipes. Thus the left compartment can be emptied of stones, mud, etc., without unsealing the trap.

263. Purifying sewage, etc. J. Houzeau, G. Devideix, and J. Holden.
This consists in applying different liquors (either weak or concentrated), got by lixiviation of (1) coal ashes; (2) pyritous, ligneous, or sulphurous ashes; (3) ashes and residues from manufactures of soda, sulphuric acid, sulphate of iron, and the waste from products used for polishing glass; (4) all refuse of products used for industrial purposes; and (5) lye waters used in crystallisation of alums, sulphur of alumina, sulphate of iron, and all crystalline salts.

272. Purification of gas and utilisation of by-products, etc. R. W. Wallace and C. F. Claus.
The gas is admitted at the bottom of square towers filled with angle iron. In purification, gaseous or liquid ammonia is used (from decomposition of chloride of ammonium by lime) for elimination of carbonic acid, the carbonic acid being utilised to produce carbonate or bicarbonate of soda. Sulphide of barium is also used in the purification for depriving the gas of carbonic acid. Also a mixture of sulphide of ammonium and sulphide of barium for elimination of bisulphide of carbon or sulphur compounds other than sulphide of hydrogen; also sulphurous acid for elimination of sulphuretted hydrogen. The lime, in the above process, removed as chloride of calcium, may be run into sewers and rivers. The invention relates further to manufacture of sulphocyanide of barium, chloride of barium, and other secondary by-products.

287. Ventilating. S. Hannington.
Air is admitted from without, through a pipe, into the upper part of a chamber forming part of a cupboard or the like in a room, whence it passes into the room. It is filtered in passage into the air-chamber, and may be heated.

295. Ventilation. R. Weaver.
As applied to large structures, this comprises an injector ventilator (fixed in windows, walls, or doors), the outer part being a scrubber with a series of deflecting plates or gills, against which the air impinges, throwing down solid impurities; a stream of water may be admitted at the top. From a reservoir, the air is tilted up by a series of plates with louvre arrangement. The upper part of the inlet is always below the level of the under part of the outlet. Further, an extractor ventilator, consisting of a tube placed in the roof, walls, or chimneys, controlled by a self-regulating counterpoised valve moved by the outgoing current. The exit end, protected by a cone, is at a higher level than the inlet. Modifications are described.

320. Gullies. G. Schofield.
This relates to an improvement on No. 3576 of 1873, and No. 141 of 1876, and consists in application of a hinged trap near the orifice of a pipe of the gulley which communicates with the branch pipes of the sewer or drain.

323. Ventilating. D. Crossley.
The front part of a box inserted near the top of a wall and communicating with a chimney is fitted with a flap which fits against the curved bottom edge, and has a pendent rod near its bottom with screw weight on it, for adjustment to varying pressure.

333. Stench traps. J. Kent.
For the curved tube or bulb and the earthenware connection pipe is substituted a straight outlet tube rising at an acute angle from the side or end of the reservoir; its lower orifice is closed by the water in the chamber, and its other with the sewer.

376. Traps for drains, etc. J. Kitson.
The trap is concave at bottom and has a partition reaching 2 in. or 3 in. below the outlet. A balance flap, supported in a V-shaped piece of metal, fits closely on the inlet. The weight of water or sewage from the pipe open the flap, so that it throws off its contents, which pass on through the vessels, and the flap resumes its position, so that any gas from the sewer must force its way down through the water of the vessel and under the division before it can reach the inlet pipe, and any gas pressure below the flap only closes it tighter.

407. Sewer ventilator. C. C. Creeke and H. Sharp.
From the sewer a ventilating shaft rises to within about 2 ft. of the road surface; into the top is inserted a zinc cylinder, with galvanised wire net bottom, containing charcoal; at the top a truncated cone is placed, so that the central aperture allows upward escape of the deodorised sewage gas, but slopes off any wet or dust from the grating into the sludge chamber outside, which is a double cylinder with annular space open at top and bottom.

422. Purification of gas. T. N. Kirkham, D. Hulett, S. and J. Chandler.
In a cylindrical vessel works a shaft, having a series of connective tube (or volutes or louvre) with sufficient spaces between the gas to pass through. The tubes are wetted (in the rotation) by water in the cylinder, and the gas in its passage comes into contact with the wetted surface.

464. Stench trap. R. Ewart.
This consists of a funnel or drum, with lower (narrower) part resting in water; a series of grates (the finest at the bottom) fit loosely in the funnel; they are for catching any dirt. The funnel is enclosed in a cylindrical case.

485. Stoves or fireplaces. C. Young.
The stove is placed in front of a cover over the usual fireplace. The flue passes through the cover. Air passes through a chamber at the back of the fire-box and issues (heated) into the room, through perforations at the top.

487. Raising water from wells. W. Mather.
This is to separate the top water from the bottom water, so that only the latter may be discharged at the top. To the lower end of the rise pipe is attached a bush with (say) four vertical slots, in which are studs fixed (interiorly) on a bush attached to a pipe which collects the bottom water. Above the slots, outside, are packing rings of vulcanised india-rubber with metal washers between. As soon as the bottom is reached the weight of the upper pipes causes the one bush to descend into the other; this causes compression of the packing rings and latent expansion, so as to close the bore hole.

488. Treating sewage. J. H. Johnson.
The sewage, after removal of the larger solid contents, is treated with solution of sulphate of alumina (prepared from shale and sulphuric acid), then sufficient milk of lime to decompose any residual sulphate. The mixture is passed through a stirring well into tanks worked on the intermittent and continuous system. The sludge is dried and powdered for manure.

493. Ventilating rooms, etc. J. E. Sears.
The base part of the lower sash is perforated and a metal frame with wire gauze panel inserted. An arrangement fitted with pulleys, cords, etc. (for opening or closing), is inserted in perforators in the base of the upper sash.

4752. Ventilation and Heating. F. T. Bond.
A T-tube is fixed with its open stem (in which is a throttle valve to regulate admission of air), passing through the wall of a room to the outside. Gas is supplied by a pipe to the interior, and burns at the end of the upper arm, over which is a globe; the lower arm is closed. Air enters, is heated, and passes into the room. In another case, a stove is formed of a cylinder enclosing a truncated copper cone inverted and heated with gas.

4782. Food. W. W. Auld.
This relates to combination, in suitable proportions, of meat fibrine, albumen, gelatine, and *extractum carnis* pulverised.

4791. Obtaining fatty matters from sewage, etc. A. M. D. Graham.
After precipitation of impurities, the wet mud is heated in a retort; the fatty acids driven off are condensed with the steam.

4807. Lighting, heating, and ventilating. C. Ritchie.
To increase the light the heated products are hindered in their upward course by a perforated metal plate, or an unperforated plate to be brought over the chimney, leaving a narrow passage, or by an inverted tube. The course of the smoke may be inverted and brought up through the flame. A tube may be arranged to bring fresh air from an adjoining room to the burner, avoiding exhaustion of the air where the gas is burning.

4845. Liniment for lung diseases. E. Spink.
Nutmeg, 1 oz.; nutgall, 1 oz.; and calomel, ½ oz.; are mixed, and one drachm of spirits of wine is added to associate the particles. The powder may be rubbed on alone or mixed with a fatty body, or taken inwardly with some liquid.

NOTICE.

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Original Papers.

ON THE WATER-SUPPLY OF SEASIDE WATERING-PLACES.

BY G. W. WIGNER, F.C.S.

(*Continued from p.* 199.)

SINCE the publication of these papers commenced I have received some letters from medical officers of health requesting information as to the places from which certain samples of well water have been procured, in order, I presume, that steps might be taken for having the wells closed. I shall be very pleased to give this information to any medical officer of health who may require it if he will write to me.

As I mentioned in the last paper, I have changed the order of going round the coast, and shall now proceed with the watering-places on the Yorkshire, Cumberland, Lancashire, and Welsh Coasts.

BRIDLINGTON, on the Yorkshire coast, has a population of about 7,000, and is supplied with water by a company, who obtain their supply from two wells in the chalk. There is a constant supply, which is always available in case of fire. I am informed that it amounts to only about 14 gallons per head per day; this quantity is evidently quite insufficient for the proper supply of the requirements of the town; but an explanation may possibly be found in the fact that most of the inhabitants have (so I am told) private wells. My sample of the water supplied by the company was drawn from the mains on August 23 last, and the analysis is as follows:

	Grains per gallon.
Total solid matter	21·60
Loss on ignition after deducting combined carbonic acid	0·68
Lead and copper—none.	
Iron—traces only.	
Chlorine calculated as chloride of sodium	3·16
Hardness before boiling, 12·6° (Clark's scale)	
,, after boiling, 3·0° ,, ,,	
Nitrogen as ammonia	0·0053
,, albuminoid ammonia	0·0024
,, nitrates	0·1400
,, nitrites	traces
Total nitrogen in these four forms	0·1477
Oxygen absorbed by organic matter	0·1040

The colour of the water was a milky blue, the milkiness being due to the presence of a large quantity of suspended matter consisting of carbonate of lime deposited by the gradual escape of the dissolved carbonic acid, but there was in addition a large quantity of foreign matter and vegetable impurities. The water has not been filtered in any way, though it evidently needs it badly; efficient filtration would not only remove all this suspended matter, but also probably take away a slight but nauseous taste, which is perhaps due to this cause. The supply would be a good one if it were filtered. I certainly cannot agree with the medical officer, who, referring to this water in his report states, 'Lime itself being an essential constituent of the animal body, its existence in the fluid should be considered advantageous.' Fortunately in this case the quantity of lime is only moderate.

As an illustration of the character of the wells which furnish the private as distinct from the public supply of the town, I obtained a sample from one at an inn there. It is said that this water is only used for washing purposes, and that the company's water is the only water used for drinking purposes; but it is of course very singular that this should be the case unless the company's supply is insufficient; yet the following analysis shows that this well-water is in some respects even better than the water supplied by the water company:

	Grains per gallon.
Total solid matter	10·80
Loss on ignition after deducting combined carbonic acid	3·50
Lead—traces.	
Iron—heavy traces.	
Chlorine calculated as chloride of sodium	1·70
Hardness before boiling, 5·4° (Clark's scale)	
,, after boiling, 5·2° ,, ,,	
Nitrogen as ammonia	0·0056
,, albuminoid ammonia	0·0051
,, nitrates	0·0700
,, nitrites	0·0040
Total nitrogen in these four forms	0·0847
Oxygen absorbed by organic matter	0·0560

This water, therefore, contains about half the quantity of solid matter and of salt which are present in the town supply; it contains, however, considerably more albuminoid ammonia, though the proportion is still only on the margin line, so to speak, between first-class and second-class waters, while the proportion of nitrogen as nitrates is reduced by more than one-half. The only objectionable features in this water are the smell and taste, which certainly are not satisfactory, and the fact that it contains a rather heavy proportion of suspended matter; but by a microscopical examination I could not detect any living organisms present. If it were not for the smell and taste and suspended matter, this water would pass, but these are insuperable objections.

FILEY, which has a population of between 2,000 and 3,000, is supplied by a company who obtain their water from some springs at a place called Hunmanby. The supply is constant, except on Wednesdays, and nearly all the houses are supplied with it, but some have private wells in addition to the supply, and some private wells only. My sample of the company's water was drawn from the mains on August 23, and the results are as follows:

	Grains per gallon.
Total solid matter	17·60
Loss on ignition after deducting combined carbonic acid	5·43
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	3·40
Hardness before boiling, 7·7° (Clark's scale)	
,, after boiling, 5·5° ,, ,,	
Nitrogen as ammonia	0·0040
,, albuminoid ammonia	0·0088
,, nitrates	0·0410
,, nitrites	traces
Total nitrogen in these four forms	0·0538
Oxygen absorbed by organic matter	0·0500

This water had a dirty, opaque, yellow colour, and was full of suspended matter, which was the cause of the opacity. When warmed, the smell of the water was most offensive, and certainly gave a strong suspicion of urine; the taste was equally objectionable. The microscopical results were unsatisfactory; a very large amount of foreign organic matter was evidently present. It will be seen from the figures that the albuminoid ammonia was

rather high, and the loss on ignition very high. This loss on ignition acquires importance when as in this case there are scarcely any nitrates present to account for it. A consideration therefore of the whole of the results shows that the water is badly filtered, of third-rate quality, and generally unsatisfactory.

I also procured a sample from a private well at an hotel in this town. The proprietor said this water was used for washing only, but I should much prefer not to have cooking utensils or clothes washed in such a liquid as is drawn from this well. Its analysis is as follows :—

	Grains per gallon.
Total solid matter	206·40
Loss on ignition after deducting combined carbonic acid	27·52
Lead and copper—slight trace.	
Iron—heavy trace.	
Chlorine calculated as chloride of sodium	62·71
Hardness before boiling, 64·0° (Clark's scale)	
,, after boiling, 22·0° ,, ,,	
Nitrogen as ammonia	0·0044
,, albuminoid ammonia	0·0143
,, nitrates	5·9400
,, nitrites	0·0090
Total nitrogen in these four forms	5·9677
Oxygen absorbed by organic matter	0·3220

The water was of a dirty urine yellow colour, and it contained a large amount of suspended matter; the microscopical examination showed numerous crystals of urea and urate of potash. The taste and smell resembled those of a fair sample of stagnant sewage. The nitrogen as nitrates is heavier than in any water I have previously reported upon in these papers. The total solids are nearly twice as heavy as they are in the Dene well at Yarmouth and the artesian well at Harwich, which are about two of the worst waters I had until now referred to, and taking all the figures into account, it is about on a par with the private well reported on at Lowestoft. The well is virtually a cesspool, and the sooner its use for washing purposes 'only' is abandoned, and it is, if necessary, utilised as a cesspool, the better it will be for those who may visit the hotel.

SCARBOROUGH with a population of some 27,000 has a constant supply of water which is obtained from rock springs and wells, and amounts to about 26 gallons per head per day. I have analysed two samples, one drawn from the mains on August 23, last, and the other received from the surveyor on August 30. The following are the results of the two analyses.

	From Main. Grains per gallon.	Surveyor. Grains per gallon.
Total solid matter	21·40	25·00
Loss on ignition after deducting combined carbonic acid	4·01	3·28
Lead and copper—none.		
Iron—slight trace.		
Chlorine calculated as chloride of sodium	4·09	3·98
Hardness before boiling, From Main, 14·8°; Surveyor, 13·4° (Clark's scale)		
Hardness after boiling, From Main, 6·4°; Surveyor, 5·4° (Clark's scale)		
Nitrogen as ammonia	0·0054	0·0020
,, albuminoid ammonia	0·0032	0·0020
,, nitrates	0·1680	0·1650
,, nitrites	trace	trace
Total nitrogen in these four forms	0·1766	0·1690
Oxygen absorbed by organic matter	0·0400	0·0240

Both samples had a satisfactory pale blue colour, and they were free from offensive smell; the sample received from the surveyor was free from taste, but that which my assistant drew from the main had a *slight* astringent taste which resembled alum. The amount of sulphates calculated as sulphuric acid in this sample was 2·09 grains per gallon. The amount of sulphates in my sample is in excess of that present in the sample received from the surveyor. Both samples were free from suspended matter, and the microscopical examination only showed the presence of those traces of vegetable fibre which might be expected; there were no animalculæ. The water is rather hard, but most of the hardness is only temporary and, on the whole, the supply is a satisfactory one.

WHITBY has a population of between 12,000 and 13,000, and has a constant water-supply, but it amounts to only about 13 gallons per head per day; the supply is always available in case of fire. It is derived from deep springs, and naturally filtered through a fine grain sandstone which is the formation of a large moor, called Grosmoor, near the town. A few houses are, however, still supplied by independent wells. My sample of the town supply was drawn from the mains on August 23 last, and the results are as follows :

	Grains per gallon.
Total solid matter	10·60
Loss on ignition after deducting combined carbonic acid	0·54
Lead and copper—none.	
Iron—slight trace.	
Chlorine calculated as chloride of sodium	1·99
Hardness before boiling, 9·4° (Clark's scale)	
,, after boiling, 3·8° ,, ,,	
Nitrogen as ammonia	0·0044
,, albuminoid ammonia	0·0037
,, nitrates	0·0390
,, nitrites	0·0030
Total nitrogen in these four forms	0·0501
Oxygen absorbed by organic matter	0·1120

The sample was at first entirely free from suspended matter, although traces of chalk were deposited after standing; its colour was perfectly satisfactory, but there was a clearly perceptible smell and taste of peaty matter. It will be noticed that the total solids are very low. The microscopical examination did not show any animal matter. The water is a good one.

I also had a sample from a private well, and the results were as follows :

	Grains per gallon.
Total solid matter	65·10
Loss on ignition after deducting combined carbonic acid	18·18
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	18·08
Hardness before boiling, 21·0° (Clark's scale)	
,, after boiling, 13·8° ,, ,,	
Nitrogen as ammonia	0·2240
,, albuminoid ammonia	0·0600
,, nitrates	0·8220
,, nitrites	0·0180
Total nitrogen in these four forms	1·1240
Oxygen absorbed by organic matter	0·6440

The sample had a filthy brown colour, and an offensive smell and taste, while the suspended matter weighed nearly 15 grains per gallon. It is scarcely necessary, however, to look further than the albu-

minoid ammonia to see that concentrated sewage is the only phrase which can express the character of this water. It seems quite unaccountable that when a town is supplied with water of good quality, such as the Whitby water is, the inhabitants or any of them should yet prefer to drink such a filthy fluid as that which is represented by this analysis.

MARYPORT, on the Cumberland coast, has a population of about 7,000. The water-supply is constant, and is derived from a river from whence it is pumped into a reservoir, and filtered through sand and gravel. My sample was drawn from the mains on August 30 last, and gave the following results :

	Grains per gallon.
Total solid matter	6·40
Loss on ignition after deducting combined carbonic acid	0·65
Lead and copper—none.	
Iron—slight trace.	
Chlorine calculated as chloride of sodium	1·28
Hardness before boiling, 2·9° (Clark's scale)	
,, after boiling, 2·1° ,, ,,	
Nitrogen as ammonia	0·0027
,, albuminoid ammonia	0·0059
,, nitrates	0·0500
,, nitrites	0·0060
Total nitrogen in these four forms	0·0646
Oxygen absorbed by organic matter	0·156

The water had a slight dirty yellow colour, from the presence of suspended earthy particles, and it evidently needs filtration. The total solids are extremely low, and the water is so soft as to leave nothing further to be desired in that respect; but the albuminoid ammonia is higher than is consistent with the other figures of the analysis, so high, indeed, as to bring the water into the second class, and the oxygen absorbed by the organic matter is also high.

The microscopical examination appeared to indicate peaty contamination, and this may account for the unsatisfactory results, as well as for the slight but still perceptible taste. On the whole, this explanation seems the most reasonable one, and the water may be passed as fair, although not good.

WHITEHAVEN, in Cumberland, has a population of about 19,000. The water-supply is derived from Ennerdale Lake, and is constant except on Friday afternoon. The amount of the supply is said to be 1,000,000 gallons per day, or more than fifty gallons per head per day. This is the largest quantity supplied I have yet met with, and it certainly seems excessive. The Whitehaven drains ought to be well flushed. There is a filter-bed in the service reservoir, which, however, only holds one day's supply. My sample was drawn from the mains on August 30, and gave the following results :

	Grains per gallon.
Total solid matter	5·00
Loss on ignition after deducting combined carbonic acid	0·95
Lead and copper—none.	
Iron—none.	
Chlorine calculated as chloride of sodium	0·94
Hardness before boiling, 0·8° (Clark's scale)	
,, after boiling, 0·7° ,, ,,	
Nitrogen as ammonia	0·0030
,, albuminoid ammonia	0·0020
,, nitrates	0·0240
,, nitrites	0·0043
Total nitrogen in these four forms	0·0333
Oxygen absorbed by organic matter	0·0300

There were still traces of suspended matter in the sample, which, when microscopically examined, proved to consist of earthy matter, showing that the service reservoir is too small, and the filtration inefficient. This is a great pity, because as regards total solids, salt, and hardness, this water stands first on my present list for purity, and as regards albuminoid ammonia and other nitrogenous compounds, there are barely half-a-dozen towns which can compete with it. The sample had a perfectly satisfactory colour, smell, and taste, and the microscopical examination disclosed nothing beyond the traces of amorphous suspended matter already referred to. It is, therefore, a water-supply of great purity, and if the suspended matters were removed by efficient filtration, which could be very easily accomplished, it would leave nothing whatever to be desired.

BARROW-IN-FURNESS is not strictly a watering-place, but as I obtained a sample of the water-supply, it may be useful to report upon it here. Barrow has a population of about 40,000, and the supply is derived from rainfall, which is collected in reservoirs about nine miles from the town. The reservoirs appear to be insufficient in size, and larger ones are being constructed. The supply is constant, and averages twenty to twenty-five gallons per head per day, and the water is not filtered. The following is the analysis of a sample from the mains on August 30 :

	Grains per gallon.
Total solid matter	11·40
Loss on ignition after deducting combined carbonic acid	2·29
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	1·64
Hardness before boiling, 2·2° (Clark's scale)	
,, after boiling, 1·5° ,, ,,	
Nitrogen as ammonia	0·0037
,, albuminoid ammonia	0·0039
,, nitrates	0·0250
,, nitrites	0·0030
Total nitrogen in these four forms	0·0356
Oxygen absorbed by organic matter	0·0880

The water was heavily charged with suspended matter, showing the necessity for improved filtration and increased storage room; the microscope showed a large number of monads and other animalculæ, but no other organic impurities. The water is very soft and the salt low; the nitrogenous compounds are also low. It is greatly to be regretted that a water in all other respects so good, should have to be condemned for imperfect filtration, or rather for no filtration at all, and for the presence of such a large number of living organisms. Surely the town authorities of Barrow have spirit enough to take the matter up and set it right.

MORECAMBE has a residential population of about 4,000, and has a constant supply of water derived from springs; the supply is always available in case of fire, and is said to amount to from 20 to 25 gallons per head per day. The water is not filtered. I have obtained two samples; one drawn from a main in Morecambe itself, on Aug. 31, and the other on the same day, from a main in Poulton, which is a suburb of Morecambe, and appears to be supplied with the same water. The results are as follows :—

	Morecambe. Grains per gallon.	Poulton. Grains per gallon.
Total solid matter	3·00	3·00
Loss on ignition after deducting combined carbonic acid . . .	1·30	1·40
Lead and copper—none.		
Iron—very slight traces.		
Chlorine calculated as chloride of sodium	1·17	1·29
Hardness before boiling, Morecambe, 1·5°; Poulton, 1·5° (Clark's scale)		
Hardness after boiling, Morecambe, 1·5°; Poulton, 1·5° (Clark's scale)		
Nitrogen as ammonia . . .	0·0019	0·0024
,, albuminoid ammonia .	0·0027	0·0025
,, nitrates	0·0280	0·0280
,, nitrites—none.		
Total nitrogen in these four forms .	0·0326	0·0329
Oxygen absorbed by organic matter .	0·0780	0·0780

It will be seen that the results are very closely concordant; the colour of the water in both cases was slightly yellow from the presence of minute traces of suspended clay. The smell and taste of both samples was good, the microscopical examination was very satisfactory; I could not detect any foreign matter beyond the traces of amorphous sediment in the suspended matter. As regards mineral constituents, this is an extremely good water, and as regards nitrogenous compounds it is satisfactory. It must be summed up as an excellent water-supply. I have also received another sample from the surveyor of Morecambe, and the results are quite confirmatory of the previously quoted ones.

In my next paper I purpose dealing with the supplies of Blackpool, Lytham, Southport, Birkdale, Waterloo, New Brighton, Rhyl, Abergele, Pensarn, and Llandudno.

(*To be continued.*)

THE DWELLINGS OF THE POOR IN LONDON.

BY HENRY C. BURDETT.

Sanitary Commissioner to the SANITARY RECORD, Author of The Cottage Hospital, Reports on the Sanitary Condition of the Government Offices, etc.

IN choosing as the subject for my paper the condition of the dwellings of the poor in large towns, I have done so with the full knowledge that already many papers have been read, and much has been written upon this question. Still I am of opinion that so long as an abuse exists, so long is it necessary to direct public attention to it, in season and out of season, until a complete remedy has been found. Thus it is that having myself become fully alive to the actual state of affairs from a personal inspection of many houses of the poor in some of the large towns in the United Kingdom, I am emboldened in the interests of the public health to detail briefly my experience of these dwellings in London — an experience gained chiefly as Commissioner of the SANITARY RECORD, and during the past year. I propose to give briefly some account of the exact condition in which I found certain houses, to examine the causes which in my opinion mainly foster the present abuses, and to suggest a remedy. A paper upon public health or any kindred science is absolutely useless unless it is thoroughly practical, and I must therefore ask you to try and accompany me in imagination while we visit together the homes of the working poor, not of the criminal classes, but of those work-a-day people who do the rough labour of our large cities, and who, although surrounded by poverty, are as a rule both honest and respectable.

One characteristic quality all sanitary reformers must have—courage—and I shall assume that all of us possess it to-day, for without it we shall turn back or abandon our disagreeable and not unfrequently dangerous task, before it is half completed. It is true that the highest type of courage, which secures for its reward the Victoria Cross, is that of the soldier. I question, however, very much if the zealous medical officer of health who knows his duty, and is not afraid to discharge it, does not often carry his life in his hand, quite as readily as the bravest soldier whose valour is stimulated by the excitement of the moment. There is no excitement about the work of a medical officer of health, not even at the time of an epidemic; on the contrary, the hours which he spends in the feverdens of a large city are often hours of great depression, anxiety, and danger. No one can adequately realise this truth unless they have had personal experience of the work itself, but this is a point which sooner or later the public will grasp, and when that time arrives, I believe the medical profession will win, if possible, even a higher place in public esteem than it possesses at present. For, if it be a noble act to show a reckless disregard for one's own life in the face of an enemy, and for the sake of country, it is certainly more noble still to devote the energies of a life to the removal of dangers and diseases which threaten not only one nation or one family, but the whole human race. Such a sacrifice preventive medicine demands from its votaries, and for this reason, sanitary science has in less than ten years, become a great power, certainly in England, if not throughout the world.

One word more before we begin our inspections together. We are about to enter the houses of the poor in London. As a rule, the houses are comparatively clean, but although the rents are often enormous, the overcrowding in places is appalling. It is a noteworthy fact that the majority of the houses in the East end of London are cleaner and in better order than those at the back of the chief streets in the West End. This is, however, the case, and Tiger Bay in the east will bear a favourable comparison with the houses in Ingestre Place, W., situate though they be within a stone's throw of Regent Street itself.

Entering London Terrace, St. George's-in-the-East, we find one small house let off in rooms, and occupied by two families, the staircase in which is only 19 inches wide. The father is in each case a dock labourer, and in one instance five people, and, in the other, six, inhabit—that is eat, sleep, work, and live in—a single room, the height of which upstairs is but 8 ft. and downstairs 5 ft. 10 in., the latter being little better than a cellar dwelling. In Waterloo Court we come across another family, consisting of mother, father, and five children, all sleeping in the same bed. Next door, in an upstairs room, a bricklayer and his family of seven children occupy a bedroom which is but 10 ft. by 8 ft., with an altitude of 7 ft. In Rahn's Court, a mother, and her son aged 19, whose joint earnings amount to 16*s.* a week, share the same room and occupy the same bed, because, as

* Read at the Congress of the Sanitary Institute of Great Britain, October, 1877.

the mother explained, the room is too small for two bedsteads. In the top room of another house, which has an altitude of scarcely 6 ft., five people have resided for the last twelve years. In the course of our inspection, we notice that many of the small tenement houses in this part of London have no back premises at all, and that where these are present they are necessarily so confined as to be practically valueless from a health point of view. Further, we are forced to the conclusion that the dangers arising from the overcrowding and unhealthiness of these dwellings are not confined to the poor, for we observe that many of the worst houses, though often few in number, are situated in close proximity to many excellent habitations occupied by shopkeepers and the more respectable members of the lower middle class.

It must not be imagined that such miserable dwellings as I have described are situated only at the East End of London, for, as I have previously hinted, there are equally glaring cases to be met with in other districts. Let us therefore bend our steps westward, and, turning out of Oxford Street and along Poland Street, we shall arrive without difficulty at Little Pulteney Street, W.

Entering one of the houses, which from the outside presents a decent appearance, we find it contains eight rooms, six of which are occupied by separate families. The front rooms are not badly proportioned, but the back, 7 ft. in height, are but 9 ft. by 12 ft. All the rooms show signs of the water which during the wet weather finds its way in considerable quantities through each apartment, and all are in a dilapidated condition. In one we find a youth who to the best of his ability has repapered and painted his mother's room, for which he has been allowed 4*s.* by the owner of the property. There are altogether twenty-four people residing here in six rooms, for which they pay a combined rental of 28*s.* a week, or upwards of 70*l.* a year. The ground floor is let to a rag and bone man, who gives, we find, 1*l.* a week for his two rooms, which sum is no doubt increased on account of the disagreeable nature of his business, although the landlord reaps the sole benefit, for the poor occupants have to bear the noisome smells. For this house of eight rooms the landlord therefore gets an annual rental of quite 126*l.*

Passing on, we next visit Newport Market, in the centre of which is situated an industrial school for boys. Against the wall of the school buildings, some stables have been built. On one side is a slaughter-house, and on all are situated densely populated houses. Yet we were informed that the sixty odd boys in the school were wonderfully healthy. Be this as it may, we will enter one of the adjacent houses in Princes Row. We find it overcrowded throughout, and horribly dirty. The ashes have been allowed to accumulate on each floor and the yard at the back, and its conveniences are in a worse state than any we have seen anywhere except in Dublin. Nineteen people, men, women, and children, occupy six rooms in this house, and in one case six persons (a man, his wife, and four children), sleep in one bed, if a mattress on the floor and and two miserable blankets deserve such a name. We next enter a house in Princes Court. This house is unfit for habitation, and we report it to the health authorities. It has no water-supply, no back premises, and no convenience of any kind. Yet the landlord gets from its occupants, in sums varying from 4*s.* 6*d.* to 3*s.*, a total of 18*s.* 3*d.* per week for the five miserable rooms. One of these rooms is in the occupation of a street hawker, his daughter, aged eighteen, and his son, nineteen. All of these people share the same bed. Passing down Newport Court we enter a room at the top of the staircase of No. 14. The room is almost without furniture, as it contains nothing but a bedstead, an old mattress, and a blanket. Its occupants are a woman and her daughter, aged 14. They both present all the signs of starvation, and the blanched appearance of their lips, the sunken eye and hollow cheek, would move the sternest heart. A few days before, this woman (a confirmed beggar) had been discovered by the relieving officer, who sent her some milk and meat and bread. The milk had disappeared, but the poor creatures were quite unable to touch the solid food. The woman was a cripple, and she and her child, from constant exposure, had both fallen ill together, and neither could get downstairs to seek assistance. The woman persistently declined to go to the workhouse, and it was necessary to get a magistrate's order before she and her child could be forcibly removed. Yet the landlord had taken 2*s.* 9*d.* in advance for the week's rent, the woman told us, but he never reported the case to the authorities. We wonder who he can be. As we left the house we found ourselves at the top of St. Martin's Lane, two minutes' walk from Charing Cross. Is it not terrible to think that such a case as this can occur in the very centre of the richest city in the world? Yet we found the case as we describe it on September 26, 1877.

I may here mention that my East End notes are dated April, and my West End notes September, 1877.

What circumstances tend to create the condition of affairs we have discovered during our tour of inspection?

1. Undoubtedly the present system of employing agents to collect the rents and to manage small-tenement property is objectionable. These agents farm out the rents to others, if we understand the system aright, and so the collection falls into less and less scrupulous hands, until we only too often find that a man will rent a house from the agent, and sublet every room to as many people as he can conveniently crowd into it.

2. In some of the West End parishes in London the property is owned by members of the Boards of Guardians, who too often, it is to be feared, get elected to these posts of authority to enable them to evade the law with greater impunity.

3. The fact that many small tenement houses are owned by poor and unscrupulous people, whose living depends upon what they can make from letting the rooms.

4. The absence of some independent body, *e.g.*, a Local Sanitary Association. There can be no doubt that in St. George's, and also in many other parts of London, the sanitary inspection of dwellings as carried out at present lacks thoroughness.

5. In my opinion, judging from what I hear on all hands from those who have to put the Public Health Act into force, the powers vested in the health authorities, in cases of overcrowding, might with advantage be increased.

Turning now to the remedy, I would with all diffidence suggest one practical application, for the adoption of all who hear this paper and who have money to spare. Take shares in the Victoria,

Artisans', or Industrial Dwellings Companies and other similar Associations without delay. The directors need more capital to enable them to extend their crusade against such dwellings as we have in imagination visited together. Help again the good work by subscribing to the various coffee-tavern committees, on the ground that the poor cannot be expected to stay in such homes as we have been to to-day, and therefore the sooner some alternative to the public-house is offered to them the better.

Again, is it not possible—however exalted the position of a proprietor of small house property in large towns, be he nobleman or merchant prince—is it not possible, we say, for him to try and realise the responsibilities of drawing money continually from such tenement houses and to show some interest in the poor by visiting, at any rate once a year, parts of the property from which he derives his income? I merely throw this out as a hint, because I wish it to be understood that some of the houses described in this paper are the property of a lady of rank, whose name may be found attached to many a subscription list. After all, however, a donation to a charity costs the giver but the labour of drawing a cheque in many instances, whilst a visit to the houses of the poor would be an act of self-denial and would, I venture to think, remedy the evils at once. Further, I would say, agitate for an extension of the present Public Health Act. Try and obtain as much support as you can for a new clause, fixing the amount of cubic space which landlords must provide in each occupied room in these tenement houses. In other words, put down overcrowding by empowering the health authority in a district to prosecute the owners of all dwellings found occupied to an extent which will not allow each member of a family to have at least 500 cubic feet of air space to himself. The 91st section of the Public Health Act is, in my opinion, too vague on this point. It is dangerous to leave the magistrate to decide on the evidence whether the available cubic space in a given room—which, it must be remembered, they have not seen—is or is not adequate for the health of the inmates. On all these points much may be done, and if my remedies seem trifling I will merely say this, that if they were widely adopted, a few years would accomplish that reform in the condition of the dwellings of the poor which all who take an interest in their welfare must desire to see. In conclusion, I can only hope that many practical philanthropists will personally look into the condition of these dwellings in their own districts, as I believe such a course, if universally adopted, would so arouse public opinion on this question that the abuses at present existing would soon disappear for ever.

METROPOLITAN PURE SEA-WATER SUPPLY.

I.

VARIOUS attempts have been made during the last ten years to bring this subject favourably before the public, and we believe that one great reason of the invariably unsuccessful result of these attempts hitherto may be ascribed to a want of thoroughness in the designs put forward. To prove a decided success, this supply must be undertaken on a scale comprehensive enough to embrace every quarter of London, and private dwellings, as well as Public Baths, Hospitals, and Aquariums, must be included within the scope of it. No one can question that a very great and permanent benefit would be bestowed on our immensely overgrown metropolis by having an abundant supply of pure sea water laid on with constant pressure day and night. The waste would flow into our sewers, and help to destroy some of their noxious gases, thus keeping our atmosphere purer. Only those who have constant experience of the ascending foul gases can understand the immense amount of defilement our atmosphere is daily undergoing from this cause.

The introduction of pure sea water on a large scale—say, as much as five to six million gallons daily, would, it is calculated, be readily taken up by a population numbering four millions, once its great benefits came to be thoroughly appreciated by the masses. More frequent bathing would inevitably result as a general rule, and swimming being more easily learned in sea water, would become quite a common accomplishment. An increase of bodily health would speedily result from the frequent use of the sea water in private houses or at the nearest public bath. Another important consideration is that in the household sea-water bath the temperature may be raised to any suitable degree, according to necessity or inclination, whereas in the sea it is the same for all. Many constitutionally feeble persons would gladly bathe in the sea, but cannot do so for fear of the consequent shock to a constitution not over strong. In private houses this objection can without any difficulty be overcome in the ordinary way, and a comfortable bath found to be a real enjoyment, without any of the disagreeable accompaniments of the seaside. Brill's baths, at Brighton, are proverbially celebrated on account of their agreeable and comfortable accessories, and are considered a real luxury, and paid for correspondingly.

The object of this and future articles is to show that, by a judicious expenditure of capital, pure sea water can be brought to London, and delivered in the houses of all desiring it, at a sufficiently economical rate to put it within the reach of the most moderate income, and that a very handsome revenue can be obtained from the venture conducted judiciously. It may safely be maintained that provided an abundant supply of pure sea water can be introduced into London, it would find a ready demand at amply remunerative rates, and the beneficial consequences would soon be recognised, causing an ever-increasing demand for the health-giving element. To prove a success, therefore, this project for the benefit of London and its suburbs must be embarked upon at the outset on a scale commensurate with the metropolitan wants, and should be undertaken under the auspices of the Metropolitan Board of Works, as the authority most competent to deal with the immense labour of laying mains and services through the London streets, and between London and the south coast at Lancing, the proposed source of the supply.

The following slight sketch of one proposed mode of obtaining the supply will put the subject in a clearer light than it has hitherto appeared to the general public. From a well excluding fresh water a tunnel 5 ft. diameter will be driven 60 ft. under the high water mark to a distance of about 1,000 yards seawards, where an inlet to the tunnel and well will be constructed. The sea water will be forced by very powerful pumps to a summit level of

500 ft. above the sea three miles away, whence it will flow by gravitation to a reservoir large enough to contain a few days' supply in case of accidents or repairs, thirty miles away from the sea, whence it would flow by gravitation to London, and rise to a height of about 200 ft. anywhere in Surrey or Middlesex. The mains would be large enough and the head sufficient not only to supply London and suburbs to the extent of five million gallons daily, but also to embrace the towns, villages, and residences on the route of the supply, or within a reasonable distance of it, wherever demanded, to the amount of two millions more per diem. The rate would be so reasonable that very few would object to try the beneficial effects of a supply of pure sea water, laid on with constant pressure, so that it could always be obtained when required, not only in summer, but in winter, when sea bathing is impossible. One great feature of the scheme is that bathing in sea water can be accomplished all the year round in a private dwelling or in a public swimming-bath at a very moderate outlay to each household or individual, and providing a handsome income on the capital expended on the necessary works, which must be borne in mind as one of the main considerations. S. M. B.

THE

SANITARY RECORD.

FRIDAY, OCTOBER 5, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

THE PUBLIC HEALTH (IRELAND) BILL, 1877.

THE withdrawal of this bill at the end of the session was received with very general satisfaction for the reason that the measure, as it was introduced, would only have served to stereotype the present unsatisfactory state of sanitary administration in Ireland. The bill, as our readers are aware, was introduced so long ago as March 15 of the present year. It cannot, however, be considered even so fresh a measure as this, for it was, when brought before the House, substantially the same bill as that of the previous session. Thus Parliament has had this measure before it for two sessions. When introducing the measure, Sir M. Beach said, if discussion were desired, the bill might be referred to a select committee. Everyone said that the bill could be made a useful measure, not even one of the Irish Home Rulers objected to it, and the bill was read a second time without opposition, and referred to a select committee. The select committee no doubt have improved the bill, we believe chiefly through the energy of Mr. Meldon, the member for Kildare. The select committee have introduced the following amendments:—1. To change the title of the medical officer from the indefinite one of sanitary officer to 'medical officer of health.' 2. To provide proper payment for these officers for special services. 3. To compel urban sanitary authorities to keep maps of the sewers of their districts, and revise the maps from time to time. 4. Power for sanitary authority to adopt new methods for the removal of excrement and house refuse. 5. Increased restrictions on cellar dwellings. 6. More stringent rules for the registration of common lodging-houses. 7. The providing of conveyances for the sick from contagious diseases is made compulsory. 8. It is made penal to convey the body of a person dead of any dangerous infectious disorder without due precaution. 9. It is made penal to give incorrect information when hiring a house or lodgings for any one who has suffered from a dangerous infectious disease. 10. A penalty is also provided for sending a child to school unless free from contagion. 11. A penalty is inflicted for the removal of a body dead of a contagious disease from an hospital to any place other than a mortuary or cemetery. 12. The officers of burial grounds are required to make returns to the district registrars of the addresses and causes of death, with the view of making death registration more complete.

We have referred to the improvements which have been made in the bill, and we must now call attention to the defects which still remain. These are too numerous to deal with in detail, but we shall point out some of the more remarkable. 1. The want of uniformity in sanitary districts and authorities remains as in former enactments. The 'urban' and 'rural' districts and authorities still charm the official mind; numbers of little towns in Ireland are left to carry out sanitary administration without any experience, without brains, and without the necessary means to pay the expenses. 2. There is no provision for constant supervision by the central authority. Such a provision is not *essential*, as the Government at present possess the requisite powers for inspection and supervision, and, we hear, are likely to exercise them. 3. The powers for the union and alteration of districts are insufficient and too complicated. Thus, districts cannot be united or altered without a 'provisional order,' which involves an application to Parliament; nor can such order be issued except by an application from the local authority; neither the Local Government Board nor the inhabitants of the district can make the first move in the matter. 4. Numbers of powers are conferred on urban authorities which for some unaccountable reason are to be denied to rural authorities. Thus, houses in rural districts may be built anywhere and anyhow, quite regardless of drains, streets, roadways, or anything either belonging to the authority or their neighbours; an urban authority may interfere with accumulations of manure which

'ought to be removed,' but rural authorities are to have no such power, and a country village may be poisoned by a dung-heap, but if the village happens to be big enough to be called a town, the authority will have power to deal with the nuisance; an urban authority may supply water to the whole or part of their district, but a rural authority cannot supply a village except by order of the Local Government Board or Act of Parliament. 5. When special orders are issued by the Local Government Board for the prevention of epidemics, for some unaccountable reason the orders are to be executed by the poor-law guardians in all cases. Thus, when an epidemic arises, the urban authority is not permitted to control the epidemic, but the adjoining rural authority must provide a new staff of officers and fresh appliances at a most critical time. This appears to us to be the most stupid provision in the whole bill. 6. We find numerous small errors through the bill, which, if they become law, might give rise to serious difficulties in enforcing the provisions of the Act.

The delay which has occurred in the progress of the bill will enable Sir Michael Hicks Beach (if not obstructed by his subordinates) further to improve the measure next session. From the manner in which Sir Michael has dealt with many of the amendments which have been suggested to him, we have little doubt he will carefully consider the defects which we have pointed out.

A SANITARY HINDRANCE.

THE Reservoirs Bill lately passed will enable owners who have merely a life interest in their estates to make the cost incurred in providing a proper water-supply a charge on the estate. This is quite right and proper, but although a step in the right direction is only one step in a ladder whose rungs ought to be very numerous. For instance, in rural districts, the farmers, who as a rule have only a yearly interest in their estates, have often to pay for sanitary works which are intended to last for generations. The consequence is that not only are rural sanitary authorities apathetic, but they are, from motives we must all admit to be to a certain extent equitable, actually obstructive.

The right thing to be done by our legislators is to permit and encourage in all sanitary matters the principle laid down in this recent Water Bill. By all means let posterity pay its fair share of the cost of works presentity is compelled, for permanent health reasons, to undertake. Sanitation at present is a bugbear and old-man-of-the-woods to yearly tenants, and on the face of it it seems fair that a yearly tenant ought not to be charged at the same rate a life-tenant is charged. Again a life-tenant ought not to pay quite all at once or altogether for improvements which will benefit his successor.

We will make another suggestion, and it is that during the recess sanitarians generally, medical officers of health, and sanitary inspectors and surveyors, should formulate any suggested wants or improvements in sanitary law and practice. The chairmen and members of sanitary authorities should also formulate their ideas and grievances and wishes. We shall be happy to become the recipients of these expressions of experience, opinion, or wishes, and will engage to condense and arrange them in the order of their subject.

By these means the Government will be able to obtain a real expression of public sanitary opinion, and in all probability by mutual help, concession, and confidence, a great and willing advance may become practicable in the way of truly National Sanitary Reform.

Notes of the Week.

The new Victoria Baths, at Glasgow, were opened on Sept. 22. The cost of the building has been 10,000*l.*

ONE of the applicants for appointment as inspector of nuisances for the Ripley urban sanitary district was eighty-two years of age.

THERE were sixty seven applications for the surveyorship to the Wimbledon local board and urban sanitary authority, at 250*l.* per annum, with residence.

In Breslau, a successful attempt has been made to erect a paper chimney, about 50 feet high. By a chemical preparation the paper was rendered impervious to the action of fire or water.

DR. SAMUEL ELLISON, medical officer to the Poplar District Board of Works, died suddenly on the 24th ult., at his residence in East India Dock Road, at the age of sixty-four.

THE Bridgewater rural sanitary authority have accepted plans for the drainage of Cossington, prepared by their surveyor, Mr. Down. They are to be carried out at once, at a probable cost of 300*l.*

AT the instigation of the House Committee of the London Hospital, the Board of Works for the Whitechapel district have commenced to lay wood paving in the Whitechapel Road in front of the London Hospital.

WE notice among Messrs. Churchill's announcements for the forthcoming season: 'A Handbook of Analysis of Water, Air, and Food, for the Medical Officer of Health,' by Cornelius B. Fox, M.D., M.R.C.P., medical officer of health for Central East and South Essex.

THE Penzance Town Council have unanimously elected Mr. G. B. Millett as medical officer of health of the borough, at a salary of 40*l.*, medical superintendent of the urban sanitary authority's hospital, at a salary of 5*l.*, and medical officer of health to the port sanitary authority, at a salary of 5*l.* These appointments are for twelve months.

AT the first statutory meeting of the Crieff Coffee House Company, held recently, the report showed that the capital of the company was 600*l.* in 1*l.* shares; that these were all taken up; that a reading-room, ladies' coffee-room, etc., had been opened, and that the undertaking had hitherto been well supported.

SODA WATER.

SEVERAL recent reports of public analysts remind us of the necessity of some more careful supervision of the soda and seltzer waters of commerce. It would be as well, however, if instead of confining their attention to the traces of lead, copper, etc., which they are apt to contain, they would also determine the organic purity of the water used. Nothing can exceed the flatness and nauseous flavour of

some of the aerated waters of commerce, when once the gas has been allowed to escape. Some time since in tracing a limited outbreak of typhoid fever in a shooting-party, the poison was traced to the soda-water bottle, which was charged, as much soda and seltzer is, from a well on the premises of the maker, the said well being impregnated with sewage. It might be advantageous if the medical officer of health would examine some of these wells.

'DOMESTIC ECONOMY.'

SIR CHARLES REED, in his annual statement to the School Board on their reassembling, observed that it might be well if some simple name could be given to the subject known as domestic economy, which is so apt to be regarded by many persons as a fanciful and unnecessary part of education, and that if they knew that it meant teaching children how to keep a house clean, how to filter water, and ventilate rooms, we should hear no more objections on that score. It would, however, be difficult to find a term which so well covers the whole range of matters comprised in domestic sanitation and hygiene. Doubtless, as knowledge of the value of the instruction imparted under the name of 'Domestic Economy' increases, and its practical benefits are realised, it will become a household word, and one 'understanded of the people.'

WORKROOMS.

SOME praiseworthy efforts have recently been made in the form of appeals to employers of female labour to devote attention to the question of providing homes for working girls. Although some large commercial firms study the well-being of those in their employ, we fear the majority even in their workrooms entirely disregard hygienic conditions. The greatest evil is probably overcrowding, and this we should like to see dealt with by our Factory Acts. It was but a few days since we had occasion to visit the premises of a milliner in a central district of London. The proprietor was contemplating making some alterations in his establishment, and among others, converting a cellar 7 feet high into a workroom for forty girls. We remarked upon the limited space for such a purpose, and were met with the reply, that it would be 'a far better place than many of the workrooms in the City.' Upon measuring the place we found that each girl would *enjoy* a cubic space of 50 feet! The minimum amount of cubic space per head allowed in common lodging-houses and in workhouses to paupers is 300 cubic feet, and even this is only half the amount considered necessary for soldiers in barracks. What then is likely to be the effect upon the constitutions of the poor girls who have to spend the whole day in such a vitiated atmosphere made worse by the necessary use of gas lights? So long as employers are content that their workpeople, even when under their immediate observation, should be subject to influences so highly prejudicial to health, we fear there are but faint hopes of their taking any interest in the state of their homes. We shall be glad to receive information from correspondents of cases of overcrowding that have come under their notice.

USES OF IMPURE WATER.

AN eminent French chemist, M. Gérardin, has, according to *Cotton*, published a pamphlet in which he maintains that the causes which render water good or bad for manufacturing purposes have no relation to its purity, but that water largely impregnated with sewage matter is frequently possessed of important manufacturing qualities, while the pure water of artesian wells is much inferior in industrial value. A person at St. Denis, who employs the muddy waters of the Groult, which marks 74 deg. of the hydrotimetre, for washing wool, failed completely when he tried to adopt the water of an artesian well, which was perfectly limpid, and marked only 44 deg. A manufacturer of gelatine, at Paris, was stopped in his work one day, when the water company, which had formerly supplied him with Seine water, changed it, at his request, for the pure water of the Vaune, lately brought to the capital. Once the fact, was ascertained, the Seine was supplied as formerly, and the manufacture proceeded as usual. M. Gérardin says that the industrial value of water depends greatly on the facility with which it deposits matters contained in suspension. Testing with milk of lime, the best water for manufacture is that in which the lime is deposited the most rapidly. The best manufacturing qualities are never found, he says, in water which gives much bubbles or foam. If water which is found suitable for manufacturing purposes be examined by means of a microscope, of at least 1,000 diameters, it will be seen that the particles left in suspension are inert, or only affected by gravity, while water found unsuitable for industrial purposes seems animated by a gyratory influence which overcomes gravity, and keeps them in constant suspension. M. Gérardin gives this movement the title of 'Brownien,' after the English botanist, Robert Brown. This gyratory movement may be destroyed by the introduction of organic matter, etc., in the state of putrefaction, and then it becomes easy of decantation, and, in the industrial sense, good water. On the other hand, he has not found the means of giving the gyratory motion to any water which does not already possess it. The curious inference drawn from these facts is that sewage water, and the waste water of certain factories which are turned into rivers, while they corrupt the waters of such rivers as regards potability, endow them with important manufacturing qualities. Thus, the waters of the Seine above and in Paris, which are relatively valuable for manufacturing purposes, are still more so after the contents of the great sewage collector has been emptied into them; while, it may be observed, the ponderable matter becomes deposited within a very short distance.

COST OF SURVEYS.

THERE has been some discussion at a Local Government Board meeting held lately at East Dereham, concerning the engineer's charges for the preliminary surveys, levelling, plans, and detail drawings executed by him, and it would appear that the amount, 748*l.*, is very much grudged, not upon the score of its being an excessive one, but because the rural sanitary authority had exceeded their powers or instructions in saddling the ratepayers with so large a sum. The sanitary authority had general powers in the matter, but it was complained that there ought to have been a greater ventilation of the subject before the expenses were incurred.

This case is peculiarly interesting, as it serves to show how careful both the profession and clients should be when giving orders concerning comprehensive schemes, such as those of drainage or water-supplies for a town or district. It appears that in June, 1874, the rural sanitary authority were acting as such for the whole of the union, and that in May, 1875, the Local Government Board gave the authority the powers of an urban authority over the parish of Dereham. The question naturally suggested itself whether the authority, having gone before the law and incurred these expenses, could not be called to account in some form or other, and whether the parish of East Dereham could be made responsible to the full extent, at any rate, for such action on the part of the authority, involving as it did the greater part of this bill of charges. The whole of the larger items stood in dates prior to May 5, 1875, when the powers over East Dereham were given to the sanitary authority. Apart from whatever legal force that might possess, the board declined to let this account pass without full scrutiny, so that the ratepayers might be satisfied that their representatives on this board had done their best for the interests of the parish. What form this should take was for them to decide; but the opinion was expressed, that such charges ought never to have been incurred by the rural sanitary authority, without obtaining the consent in some form or other of the persons who would ultimately have to pay them. If the payment of the money had rested with

the gentlemen who incurred the cost, it would have been quite another matter; but this was not the case, and therefore this bill of charges required careful consideration.

All we have to remark is this, that, if authorities employ engineers, and take up months of their time and that of their assistants, they must be prepared to pay for it on a proper scale. In a similar way, if a gentleman orders a house to be designed for him, and declines to erect it after all, the architect is nevertheless entitled to 2½ per cent. upon the estimate. We should recommend the board to pay the account, which does not appear at all overcharged.

THE PRESSURE OF GASES IN SEWERS.

IN criticising an appliance of Mr. Master's, a Bristol architect, for ventilating houses and excluding sewer gases, Mr. Ellice Clark made some observations upon the pressure of gas in the sewers, which we quote as likely to be of interest. Mr. Clark does not believe sewer gas forces the water in a trap. He does not believe either that there is much, if any, pressure in sewer gas. The gas passes into the water and escapes by levitation and not by pressure. The capacity of water for holding sewer gas is very analogous to that of sponge for holding water. A cubic foot of sponge will hold so much water, and as soon as it becomes charged the water drops by gravitation. A cubic foot of water holds so much gas, and as soon as it becomes charged the gas escapes by levitation. The specific gravity of sewer gas is much like that of air. The result of a large number of experiments made by Dr. Russell and Mr. Nicholson, and one or two made by Mr. Clark himself, showed that, taking the atmospheric air at 1,000, sewer gas has been represented by 1,096. The diffusive power of the gas is very great. Mr. Nicholson, in Sunderland, had a pressure gauge made, and his experiments were extended over something like two years; and he found that the greatest pressure he could get was ·5 to the oz. upon a square inch. Mr. Clark does not think that that would anything like force a water-trap; and believes that the idea of the trap being forced by the pressure of sewer gas is erroneous. The gas that passes in escapes by levitation.

With these remarks we entirely coincide, but there is nevertheless a possibility of a pressure of gas being created in a sewer, when that sewer is unventilated, and especially will that pressure be made manifest if the top of a sewer of steep gradient be not ventilated.

Special Reports.

THE SOCIAL SCIENCE CONGRESS.

HEALTH DEPARTMENT.

DR. STEVENSON MACADAM, Edinburgh, submitted a communication on 'The Ventilation of Drains and Sewers,' in the course of which he urged the importance of having a ventilating tube inserted in the service drain from houses to the sewers. But that of itself was not sufficient. Between the ventilating pipe and the sink there should be placed in the service drain a U-shaped trap, with upright drain-pipe leading to the surface, in the throat of which there should be inserted a wire cage containing fragments of dry charcoal. For the ventilation of the street drains and sewers, the furnaces of public works, such as gas-works, should be utilised where such were available, and open-air shafts carried from the main drain to the surface of the streets at numerous points. Besides ventilation, there should be a periodic flushing of the main drains and sewers by the opening of sluices or valves connected with large cisterns placed at proper distances apart. Dr. Macadam concluded by urging the importance of carrying the waste-pipes of water-cisterns direct to the open air.

The chairman, Mr. Edwin Chadwick, C.B., remarked that there was no great necessity for ventilation if the sewers were properly constructed.

Mr. Collins, London, suggested various modifications of the ventilating apparatus.

THE LAUNDRY A CENTRE OF CONTAGION.

Mr. E. J. Watherston, London, read a paper on this subject. He expressed his astonishment at this matter being overlooked, when so much was being done in the way of sanitary reform, and said that he believed a wide-spread knowledge of the risks consequent upon the present evil system would create the demand, to be followed very promptly by the supply, of proper washing establishments, constructed on scientific principles and aided by machinery. In order that infected linen should in no case come into contact with that of families possessing what he might call 'a clean bill of health,' he suggested a second and detached laundry, constructed specially for the reception of infected linen. He thought it might safely be assumed that the application of machinery to this branch of industry would cause a greater rather than a lesser demand for labour, and that washerwomen would be better off as assistants in large laundries than they at present were as small proprietors. He further suggested that it should be made an offence punishable by fine or imprisonment for householders or occupiers to send washing to any washerwoman or laundry whatsoever without previous notice, in the event of there being illness in the house.

ANIMAL LIFE IN FRESH-WATER RESERVOIRS.

Mr. W. Ivison Macadam, Edinburgh, read a paper on this subject. He said that for some time he had devoted attention to the forms of minute animal life to be found in water reservoirs and other naturally and artificially impounded waters, and the result of these observations showed that the more common varieties of life were found to be certain minute crustaceans of the families daphniadæ and cyclopidæ. In the first of these the Daphnia pulex and in the second the Cyclops quadricornis deserved special attention. Both these minute crustaceans were found all in good impounded waters. They are got in the water-supply of our cities and towns, and during summer especially are to be obtained in the water cisterns, and occasionally even in the water on our tables. They are abundant in Lochs Lomond and Katrine; in the reservoirs in the Pentland Hills, from which the Edinburgh water-supply is obtained; in Loch Ascog, which supplies the town of Rothesay with water, and many other similar sources. The cyclops is more common in cisterns, as being a native of the deeper parts of lochs, it is more easily drawn off in the pipes to the cities than the daphnia, which is principally found near the shore. Filtration of the water, though it may and does remove many of the 'water fleas,' does not entirely do so, as he had found them without difficulty in the water as it issued from the filters. In one case at least fear has been expressed that the use of waters containing these fleas would be hurtful to human life, and with a view of testing these statements I have made a series of experiments. These prove that the 'water fleas' are very delicate, being unable to bear extremes of heat or cold, and that an amount of alcohol equal to 4 per cent., or the slightest amount of gastric juice, was fatal. The temperature found to be fatal was 85 degrees. These forms of life are only found in good waters, and he felt certain that the use of water containing them will not be hurtful to the human system, provided that they be present in the ordinary numbers. He did not say that they were necessary to good waters, for although he had carefully searched for them, he had never been able to detect them in good well waters. Yet, were these well waters impounded in large open reservoirs, he saw no difficulty in the fleas making their appearance, and that without in the least impairing the water for domestic use.

REGISTRATION OF SICKNESS.

A paper by Dr. Cornelius Fox, on 'The Mode of Registering Sickness,' was also read, which will be published in full in the SANITARY RECORD.

RURAL SANITATION.

THE Society of Engineers held its first ordinary meeting for the session on the 1st inst. at Westminster Chambers, Mr. T. Cargill in the chair. Mr. G. W. Usill read a paper on 'Rural Sanitation,' the subjects dealt with being chiefly ventilation, water, and the disposal of sewage. Statistics proved that the mortality from epidemics was considerably more serious in rural districts than in cities, partly from the gross neglect and indifference often met with in small towns and villages, and partly owing to the increased difficulties which the engineer had to cope with in introducing efficient systems of drainage and water-supply in such neighbourhoods. The question of rural sanitation was often lightly thought of by the inhabitants of cities, who were apt to forget the important bearing of the matter on their own health, seeing that they were largely dependent upon the country for their food-supply—notably, for instance, in the case of milk, which experience had proved was not an infrequent vehicle of infection. The matter of ventilation was shockingly neglected in all directions, and engineers could do little to bring about reform without the cordial co-operation of the architects. Various modes of dealing with the sewage of outlying districts were alluded to and criticised, including the earth-closet system. The abolition of open cesspools and similar nuisances was mentioned as an almost universally admitted desideratum, and with it the extinction of the dangerous shallow wells which work such incalculable injury to the health of our rural population all over the land. Earth closets, unless they were made as automatic as possible, were worse than useless. The collection of rainwater for drinking purposes was highly recommended by the author, where a good well supply was wanting, the plan being not only a feasible but an effectual and economical mode of obtaining an unpolluted and abundant source of water, if only proper storage was afforded. The construction of deep wells, pumping apparatus, storage tanks, etc., was dwelt on at some length, the author remarking that the miserable supply of drinking water in villages often drove the villagers into the public-houses. Before concluding, he expressed his strong opinion that, bad as was the state of rual sanitation in England, in Ireland it was infinitely worse. Mr. Usill having resumed his seat, the chairman opened the discussion, Mr. Rigg confirming the remarks of the author as to the notorious neglect of the principles of ventilation, more especially among country architects. Mr. Schonheyder spoke at some length on the subject of earth-closets, after which Mr. Allen alluded to the importance of directing the attention of engineers to the great problem of dealing with flood waters, such as those which deluged the valley of the Trent, causing very serious injury to health. Mr. Pendred deprecated the fallacy of considering only the original outlay in discussing the cost of a proposed new water-supply. In doing so people often overlooked the cost of subsequent maintenance and supervision. A simple pumping and storage arrangement might cost perhaps only a few hundred pounds to start with, but it had to be kept going, and proper persons had to be appointed and paid to look after it. As to ventilation he should like to see a specimen of a well-ventilated house. He had never yet come across one. Mr. Church said the usual difficulty in introducing sanitary improvements was not only in deciding upon their form, but in getting the inhabitants to see the need for them. Mr. P. F. Nursey, secretary, alluded to the necessity for properly ventilating earth-closets to keep them in good order. Mr. Bernard Dyer, F.C.S., pointed out the frequent negligence displayed with regard to properly lining deep wells. Loose bricks were often used without any cement; surface water then percolated through, and the deep wells became nearly as much polluted as shallow ones.

Mr. Usill, having replied to the discussion, the Chairman observed that the great difference between the earth-closet system and the water-carriage system was that while the latter was automatic, and required little or no attention, the former must have efficient supervision, or it became in a sanitary sense a failure. Sewage and water schemes could be enforced upon ratepayers, but not so with ventilation. Any man could block up a ventilator in his own house, and most men would do so. In fact, the public had a general antipathy to fresh air when questions of ventilation were concerned. After a vote of thanks to Mr. Usill, the meeting adjourned.

THE METROPOLITAN BOARD OF WORKS.

AT the last meeting of the Metropolitan Board of Works, Sir J. Hogg, M.P., presiding. The report of the finance committee recommended that the permission to borrow temporarily the sum of 14,000*l.*, to purchase certain property for improvements, by the vestry of St. Luke's, be granted, and that the sum of 12,000*l.* be advanced to the parish of St. Pancras for baths and wash-houses. The burial board of the same parish also applied for a loan of 10,000*l.* for purchasing additional land to add to their cemetery at Finchley. This the committee recommended should be approved, and the committee further recommended that the application of the managers of the Central London Sick Asylum district for an advance of 45,173*l.* to pay off existing loans be complied with to the extent of 10,000*l.* The report, with its recommendation, was adopted. The report of Sir J. W. Bazalgette, Mr. F. E. Bramwell, and Mr. C. Easton, upon the best means of providing an efficient supply of water for extinguishing fires and for other purposes, was then presented. This showed that the daily supply per head for all purposes was over 20 gallons. After careful estimate it was considered that no more than 2 gallons per head were really used for drinking and for cooking purposes—about 8 millions gallons daily for the whole metropolis. The quantity required for extinguishing fires was about 300,000 gallons per day, or a total of 8½ millions of gallons a year. The report suggested separate mains, constantly charged with good spring water. To carry out this they would have to provide on high ground to the north and to the south of London four covered service reservoirs, holding an aggregate quantity of 32 millions of gallons, or enough for four days' consumption. These reservoirs would be at 400 feet above ordnance level, and for each they would have to provide sets of arterial mains which would traverse the metropolis, crossing the river, and be coupled up so as to put all the reservoirs into communication. The expense of the works was estimated at a total of 5,500,000*l.* This amount was made up in the following manner:—Reservoir pumping station and sites, 512,000*l.*; main for pumping stations, 533,000*l.*; arterial and distributing mains, including crossing the river, 3,195,000*l.*; hydrants, 600,000*l.*; house fittings, 600,000*l.* The interest on 5,500,000*l.* at 3½ per cent., amounted 195,500*l.*; the annual cost of pumping, including depreciation and a sum for management, was estimated at 32,500*l.*, making a total annual charge of 225,000*l.* The chairman said that the subject was under the consideration of the select committee of the House of Commons, and after the recess no doubt they would go into the whole matter. The recommendation of the parliamentary committee, as follows, was adopted:—That steps be taken in November for the deposit of a new scheme under the Artisans' Dwellings Act, for the improvement of the unhealthy area in Great Wild Street, unless previously to the time for the deposit of the new scheme the board shall have arranged for the purchase of the interests in the four houses in Drury Lane, which, under the Act of Parliament confirming the scheme of the year, the board is authorised to take by agreement for the purpose of the improvement scheme. The board then adjourned for the recess.

THE Bristol sanitary authority have resolved to advertise for tenders for lighting the whole or part of the city otherwise than by gas, in the event of no satisfactory arrangement being come to with the Gas Company.

Medical Officers' Reports.

SCARBOROUGH.—The births registered in the borough of Scarborough during 1876 were 817, and the deaths 469, the latter being less than in any year since 1867, whilst the births were smaller than in 1867-8. There were 124 deaths of infants under one year, which amount to 15·2 per cent. of the total births, which is below the average, in consequence of the smaller number of deaths from convulsions, wasting diseases, and diarrhœa. The number of deaths from the seven chief zymotic diseases was small, having been 39, against 69 in 1875. The returns of the vaccination officer show the care with which this important operation is carried out, as out of 832 births in 1875 only 15 children remained unaccounted for, and out of 451 births in the first half-year of 1876 only 4 remained unvaccinated, except 27 who were certified as unfit for vaccination. The 469 deaths include 21 of visitors, two of whom died from drowning, and one from inflammation of the lungs from too long immersion in the water. The death-rate was 17·05 per 1,000 population—or, excluding visitors, 16·28—which is the lowest ever recorded in the borough. The mean temperature of the year was 0·4° Fahr. above the average of eight years, the months of February, October, November, and December being unusually warm, as well as July. The rainfall was 32·63 inches, which is an excess of 4·34 inches, and the prevailing direction of the wind was S.W.

ST. ASAPH RURAL.—Dr. Lloyd Roberts refers especially in his report to the large percentage of children under one year who died without medical attendance, as 60 per cent. of the deaths at this age were uncertified, and as many as 74 per cent. of the deaths from 'convulsions' were also uncertified. As regards the latter, it seems quite time that deaths from convulsions should gradually be obliterated, or nearly so, from our returns, in the same way as has happened in regard to dropsy. He also refers to an outbreak of diphtheria, amounting to 34 cases and causing 10 deaths, and to the injury to health that arises from the erection of dwelling-houses that have not been previously sanctioned by the sanitary authority. The death-rate for 1876 was 19·92 per 1,000 population.

WAKEFIELD.—Mr. Wade reports that the annual death-rate for this borough during the half year ending June 30, was 22·56 whilst the births were 39·43 per 1,000 population, so that the natural increase of inhabitants was nearly 17 per 1,000. The death-rate for the half-year was much smaller than in 1876, and is attributed partly to the improved sanitary condition of the borough and partly to the decrease in the number of deaths from scarlet fever. Mr. Wade makes a singular calculation to show that although the actual deaths are above the average, yet that his death-rate was below the mean for all England by 1·15 per 1,000 population, because his birth-rate is larger than the average for England, thus falling into the error which is now held by few only, viz., that a high birth-rate necessarily leads to a high death-rate. The drainage system has been improved by increased ventilation of the sewers and house drains, which is strongly advocated, the water-supply is better, and many 'middens' have been covered over.

LYME REGIS.—This report is from July 1, 1876, to June 30, 1877, which is a very objectionable period, as it completely isolates the report from those published in other districts. The death-rate is stated to have been only 15·2, and the birth-rate 25·65, the marriage-rate being only 5 per 1,000 population, the mean death-rate being 20 per 1,000 for the last ten years. Considering the position of the place, the decennial death-rate is high, but as the population during the ten years 1861–71 was nearly a stationary one, this result was to be expected. Mr. Skinner compares the diet of some of the working-classes with that given in the Axminster union, and finds the former to be the worst, and insufficient for a labourer. There were only three deaths from zymotic diseases, viz., one from scarlet fever, one from typhoid (said to have resulted from insufficient diet), and one from typhus (?) supervening upon paralysis of the knee. The water-supply is said to be good and free from contamination, and the drainage of the town has been improved.

BRADFORD.—The report for the quarter ending June 30, 1877, indicates a satisfactory condition of the public health, as compared with corresponding quarters, as the annual birth-rate was 37·8, and the death-rate 23·2 per 1,000 inhabitants, against an average of 25·1 per 1,000. There were 15·5 deaths under one year per 100 births, which is rather below the average. There was an almost entire absence of zymotic diseases, the greater mortality having been caused by whooping-cough. The medical officer refers especially to the small number of deaths from fever, which he attributes to the improvement in the paving and drainage of the streets and yards, and the more careful supervision of the house-drains.

WEST SUSSEX.—This report for 1876 contains the sanitary statistics, etc., of the various districts of which this combined district is made up. Steyning, which includes Shoreham, had a birth-rate of 29·8 and a death-rate of 15·5, and in part of Shoreham was so low as 12·7 per 1,000 inhabitants. In the rural district of Horsham the birth-rate was 31·3 and the death-rate 17·2 per 1,000. An outbreak of small-pox is detailed which occurred at Southwater in consequence of the importation of a case from London, which was prevented from spreading by isolation and disinfection. Several cases of enteric fever are also noticed, which were caused by bad drainage and water, as no source of infection could be traced. In Petworth the birth-rate was 25·9 and the death-rate 15·4 per 1,000. Diphtheria was prevalent in this district. In Thakeham the birth-rate was 31·5 and the death-rate 14·8 per 1,000, the infant mortality being as low as 5·7 under one year per 100 born in Storrington. In the rural district of East Preston, the birth-rate was 29·5 and the death-rate 16·6 per 1,000, scarlet fever having been very prevalent in the district. In the rural district of Midhurst the birth-rate was 30·5 and the death-rate 16·6 per 1,000, small-pox, scarlet fever, and enteric fever having caused several deaths. In the urban district of Worthing the birth-rate was 29·1 and the death-rate, exclusive of visitors, 18·3 per 1,000, scarlet fever having been very prevalent in the autumn. In the urban district of Horsham the birth-rate was 36·5 and the death-rate 17·6 per 1,000, and the death-rate of infants 12·1 per 100 born. In the urban district of Littlehampton the birth-rate was 27·6 and the death-rate 13·0 per 1,000, excluding visitors. The uniformly low death-rates of these districts is well worthy of special attention by those frequenting watering-places.

Law Reports.

HOMICIDE THROUGH IMPERFECT GAS-FITTINGS.

A PLUMBER, employed as an inspector of gas meters in Port-Glasgow, has been apprehended by the Renfrewshire police, on instructions from the Crown authorities, on a charge of culpable homicide or culpable violation or neglect of duty, whereby a widow recently died in her house. M'Crindle, when examining the gas meter in the house, found that the meter wanted water, and it is alleged that, in place of unscrewing the usual connection, which he found to be stiff, he unfastened the outlet pipe, and afterwards failed properly to connect it. The consequence was that a great escape of gas took place, and Mrs. Lang was afterwards found dead in bed. On a medical examination of the body being made, it was ascertained the woman had died from inhaling deleterious gases. M'Crindle, after being examined before the Sheriff-Substitute, was admitted to bail.

UNCONTROLLED DOGS.

THE stipendiary magistrate for Brighton, in dealing with a case in which a Maltese terrier had severely bitten a boy in the leg, intimated his intention of inflicting severe penalties when persons were summoned before him for allowing dogs belonging to them to be at large. Every day accounts appeared in the newspapers of people dying in horrible suffering from hydrophobia consequent on dog-bites, and it was intolerable that such animals should be allowed at large without being under control. In the present case it was urged that the animal was teased by complainant, but if that was so, defendant ought to have seen the dog was muzzled; that the defendant might know his responsibilities, he would inform him that if further complaints were made he would be sent to prison without the option of a fine. In the present instance defendant would pay a penalty of 40*s*. and costs.

NUISANCE AT A BAKEHOUSE.

AT Southwark, the owners of premises in the Blackfriars Road, where the business of a baker was carried on, were summoned by the inspector of nuisances of St. Saviour's district, for having a foul cesspool under the bakehouse, injurious to health. Mr. Errington said his attention was called to the house on the 7th, and on entering the bakehouse he found the flooring loose and a nasty smell underneath. He waited until a batch of bread was withdrawn, and on examining one of the stones ascertained that the smell arose from an old cesspool. The men who were working there told him they were glad he had come, as some of them had been very ill. Witness caused notice to be served, but nothing had been done. Mr. Bianchi, medical officer of health, said he visited the premises, owing to the report of last witness. The stench was so horrible that he was compelled to retreat. Mr. Partridge observed that it was a very dangerous nuisance, and ordered it to be abated within fourteen days.

CONVICTIONS FOR NEGLECT TO DISINFECT.

G. PARKER, house agent, was summoned at the instance of the Camberwell Vestry, for having let a house in Crown Street, Camberwell, in which persons had been suffering with scarlet fever, without having first carried out the regulation for disinfecting such premises. Mr. Marsden, for the Vestry, said three children were seized with scarlet fever in the house, and after their removal to the hospital the defendant neglected to disinfect the rooms. The defendant said that he did not wish to act contrary to the law, but in this case it was an error. Mr. Ellison said such an excuse would not be admitted, especially when the public health had to be considered. The defendant was liable to a penalty of 20*l*. He required him to pay a fine of 5*l*., and costs. J. Carpenter, the father of the children mentioned in the last case, was summoned for exposing in a public place bedding, etc., used by the sufferers from fever. Evidence in support of the complaint was given, showing that the defendant had removed the bedding and clothing to another house without having it disinfected. Mr. Ellison fined the defendant 40*s*.

STRANGE DECISION OF A LONDON MAGISTRATE.

H. CRICKETT, of Earl's Court Road, Kensington, was summoned for refusing to sell to the inspector appointed under the Food Act, a pint of milk to be analysed. The inspector said he went to the defendant's shop, and asked for milk. The defendant commenced filling the bottle from a can on the floor. The inspector asked to be supplied from one on the counter, telling him it was for the purpose of being analysed. The defendant then refused to supply it, and filled the bottle with milk from the can on the floor. Witness told him he should not take the milk. Mr. Paget said the question was whether the milk left in the can was exposed for sale. The evidence was that the defendant was serving an ordinary customer from the can on the floor. The clerk of the Vestry, said the inspector was an extraordinary customer, as it was not usual for a man to go for a pint of milk. If the magistrate was of opinion that milk in a can upon a counter was not exposed for sale, the inspector would have a difficulty in proving a case. Mr. Paget inquired if there had been any previous complaint against the defendant. On the inspector answering in the negative, Mr. Paget dismissed the summons.

A MEDICAL OFFICER'S OMISSION.

AT the meeting of the Newton Guardians, a case, in which the medical officer for the Bovey Tracey district (Mr. A. N. Taylor) had neglected to properly sign an order for the removal of a lunatic, was brought up. On August 7, Mr. Taylor received an order from the relieving officer to attend a lunatic, on an occasion when the magistrates met for the purpose of granting an order of removal. Mr. Taylor did not attend, but sent an assistant, who signed the order, and the lunatic was removed to Exminster Asylum. On examining the order, the authorities, finding that it was irregular, telegraphed to Mr. Yolland to remove the patient at once; which was done a day or two afterwards. The reason for this proceeding on the part of the asylum authorities was that Mr. Taylor's assistant was not a duly qualified medical practitioner, and that the order was therefore void. Mr. Taylor, explained that he was, at the time of receiving the order from Mr. Yolland, much pressed with other business, and at the same time he pointed out that the order contained no intimation that the magistrates were going to meet at Mr. Hellier's house. He was willing, however, to refund the expenses which had been incurred by the board through the double removal of the lunatic.

VACCINATION AT CAISTOR.

AT a meeting of the Caistor guardians, Mr. Kerman, vaccination officer, reported that he had a number of defaulters under the Vaccination Acts before the Market Rasen magistrates. Two of the defendants produced certificates of the successful vaccination of their children. In one instance he had reason for believing that the child was not vaccinated, and in the other he knew that the child was not vaccinated on the day named in the certificate. The chairman read a letter which he had received from the chairman of the Market Rasen bench, calling attention to the last-named case. The letter stated that while the certificate stated the child was vaccinated August 20, the evidence of the father of the child went to show that it was not vaccinated on that day; moreover, the doctor certifying the successful vaccination of the child had not seen it since the operation was performed, and could not tell whether it had been successful. It was resolved to lay the case before the Local Government Board. Mr. Kerman stated that he proposed to institute proceedings against Mr. Skipworth, of Moortown Hall (the gentleman who made himself famous as a supporter of the claimant to the Tichborne estates), and a Mr. Dent. The clerk stated that the board had resolved that before proceedings were instituted under the Vaccination Act a third time, the defaulters should have an opportunity of appearing before the board to show cause why further proceedings should not be taken. It was resolved that Messrs. Skipworth and Dent have notice to appear accordingly.

ADULTERATED BEER.

J. CHAPPLE, landlord of the Fox and Hounds, was charged with selling adulterated beer. The case was adjourned on a former occasion to enable a sample of the beer to be forwarded to Somerset House to be tested. The certificate from Somerset House was as follows: 'The sample of beer referred to in the annexed letter was duly received on August 20, and very securely sealed. We hereby certify that we have analysed the same and declare it to contain 66·5 grains of common salt per gallon. We

have met in some instances with brewing waters which contain common salt sufficient to account for the above quantity. The strong Burton beers contain about 60 grains of common salt per gallon, solely derived from the water, malt and hops used. As witness our hands this fourth day of September, 1877.—J. Bell, R. Bannister, and H. J. Helm.' The clerk having read this document, remarked that there was nothing to show that the beer purchased was not strong Burton beer, or that it had been adulterated by defendant. He did not think that there was any adulteration. Mr. Moger, clerk to the sanitary authority, said that in the absence of any evidence that it was strong Burton beer, he should ask the bench to put the Act in force and impose a fine. The London analysts might occasionally find 60 grains of common salt in a gallon of strong beer, but that did not do away with the fact of the adulteration. In this case it had been certified that the beer was adulterated with 68 grains of salt to the gallon. Mr. Gatehouse, in reply to the bench, said he had analysed about a dozen samples of Bath beer and had never found the like amount of salt in any other case. The average was about 12 grains per gallon. The most he had found in any of the other samples was 20 grains. After a consultation the bench decided that in the face of the certificate from Somerset House they had not sufficient evidence to show that the beer was adulterated.

ARE TANPITS UNHEALTHY?

AT a recent meeting of the Crediton Commissioners a communication was received from Mr. Heygate, medical officer of health, and Mr. Blyth, county analyst, stating that in reference to the application of Messrs. Snell to obtain the Commissioners' sanction for making a tannery near Blagdon Place, they considered the local board could not justly prohibit its being done, because in the first place there is no instance on record of emanations from a tanyard having been found injurious to health; 2nd, the proposed business itself is not on a large scale; 3rd, it is to the eastward both of the town and the houses mentioned, and therefore the prevalent westerly winds would blow any offensive odour away; 4th, if a nuisance injurious to health should arise, the local board have ample power under the existing statutes to remedy it. We admit that it is quite possible that the inhabitants of the few houses in the immediate vicinity may find occasionally a slight odour, but the ordinary emanations of tanyards are not detrimental to health, and an objection solely upon the sense of smell does not afford sufficient grounds to restrict the employment of capital, and the development of trade.' Another letter was read from Mr. Bullen, an owner of houses in the neighbourhood, deprecating the making of the proposed yard, on the ground that it would depreciate the value of the property adjacent. Mr. Wellington, clerk to the commissioners, read an interpretation of the clause of the Act giving the local board power to sanction the carrying on of any noxious business; from which it appeared that such sanction would not actually legalise a tannery, supposing it were hereafter found injurious to health. Mr. Adams said the responsibility might hereafter be shifted from the commissioners, as no one would be deprived of availing himself of existing law if he wished to get rid of what was offensive. The application was granted unanimously.

Legal Notes and Queries.

TRACTION ENGINES.

THE Rye Highway Board has resolved upon a course with regard to traction engines within its district which, if legal, and if followed by other authorities, will virtually abolish the traffic. Acting under the advice of counsel, the board has decided to prosecute the owners of all traction engines with 'rough-soled' wheels, which shall be found travelling in the district after the 15th of the present month. As it is impossible for the engines to proceed under certain circumstances if the surface of the wheels is smooth, the question will arise whether the discomfort and expense caused by the traffic do or do not outweigh the advantages afforded to the public.

INQUIRY UNDER THE POLLUTION OF RIVERS ACT.

THE first inquiry under the Rivers Pollution Act of 1876, was held at Canterbury, by Mr. Robert Rawlinson, chief engineer to the Local Government Board. In July last the commissioners of sewers for East Kent complained of the river Stour being polluted by the sewage discharged from the corporation's sewage works, and threatened them with an injunction. The corporation had applied for a certificate under the 12th section of the Act, to the effect that they had used all practicable means to remedy the evil. The town clerk now asked for that certificate, and was opposed by Mr. Kingsford, barrister. The surveyor maintained that the method now in use was a success. On the other hand, Mr. Kingsford called witnesses who alleged that the sewage was very foul, and that the works were utterly inadequate. The Local Government Board will decide the question.

PAYMENT OF RATES FOR GOVERNMENT PROPERTY.

A RATE made by the Sheerness Board of Health in September, 1874, was quashed after several amounts had been collected, and these amounts were not repaid to the persons who had paid the rates in many cases until May, 1877. Among those who paid this rate was the Government. The Sheerness board received a letter upon the subject from the Treasury. They acknowledged the receipt of a report from a committee of the Sheerness board respecting 'the three sums of 594*l.* 12*s.*, 53*l.* 18*s.* 3*d.*, and 5*l.* 13*s.* 6*d.*, claimed, and actually received by the board from the Government in respect of a rate of September 24, 1874, represented by the board's claims and certificates to have been levied, but which was not actually levied.' The chairman of the Sheerness board has forwarded a copy of the report of the General Purposes Committee of the Sheerness board. The report says: 'With reference to the sum of 594*l.* 12*s.* paid in the claim for rates up to September 29, 1874, this sum should have been deducted by the clerk in the account sent Mr. Griffiths in answer to his letter of March 9, 1875. Your committee beg to observe that the printed paper sent by the Treasury to the clerk to the board to fill in rates made up to September 29, and March 25 in each year was for Government property not rated. The sums of 53*l.* 18*s.* 3*d.* and 5*l.* 13*s.* 6*d.* received by the collector in October, 1874, for the September rate for the officers' residences and coastguard cottages were duly accounted for and allowed for in the rate made in March, 1875, as ordered by the board.'

Review.

Sanitary Engineering. A Series of Lectures given before the School of Military Engineering at Chatham, 1876. By J. BAILEY DENTON, F.G.S., Memb. Inst. C.E. London and New York: E. and F. N. Spon. 1877.

[*First Notice.*]

ONE rises from the perusal of this most elaborate work with the same kind of feeling which we should fancy was experienced by the examiners of the celebrated Crichton, when at the Italian University the comprehensiveness of his genius was first acknowledged. It is not a work which has been thrown together from collected scraps or former original memoranda, having a bearing upon the general

subject, and eventually found useful when a book upon the question becomes a desideratum, but on the contrary, a carefully compiled and well-sustained exposition of the very many divisions which are generally comprehended in the term Sanitary Engineering. It is not the work either of a novice in the science, but the earnest outcome of a mind fully penetrated with the vastness of his subject, and competent from a very long experience in the profession to apprehend properly and send forth exactly what is most suited to the students who are meant to be benefited by it. It is full of practical advice, sensibly apportioned and tersely laid out, and yet the charm of appropriate diction, and the ease of fluent composition, are nowhere wanting. It is just such a thorough work as would have, by its completeness, pleased the late Professor Parkes, to whose memory it is appropriately dedicated, and from this point of view may be said to stand on the same high platform as the 'Practical Hygiene' of the Netley philanthropist. At all events, we know of no work on general sanitary engineering able to compare with it. It is in the broader relationship of engineering to sanitary science exactly what Cresy's and Gwilt's works are to civil engineering proper and to architecture, and this we mean as a high compliment to the author. All the technicalities which were capable of a simpler nomenclature have been discarded, and thus the work is fitted not only for the profession who can read between the lines, but for the general public, who desire to master the elements and, as much as possible, the specialities of sanitation. Its contents make it very evident also that it has been brought down to the latest date, and this, were even the work more crudely treated, is of itself a considerable boon. The book is admirably illustrated with woodcuts and drawings, and the reader is thus assisted by the eye in grasping his details. For the rest, it is compact, clearly printed, ably indexed, and well bound. We venture to prophesy a success for the book, and many future editions.

The work is divided into five divisions, Air, Water, the Dwelling, the Town and Village, and the Disposal of Sewage, to all of which we mean to allude in succeeding notices. We may mention parenthetically that we were especially struck with the author's views as to the necessity of overhauling every dwelling which had not as yet undergone the supervision of professional men, skilled to detect faults in drainage, owing to cesspools and old sewers; faults in water-supply due to polluted springs, contaminated conduits and defiled cisterns, and similar faults throughout the fearful chapter. Another point which struck us was the conviction expressed by the author as to the possible and even advisable re-use of some sewage effluents for trade and manufacturing purposes, in localities where water is scarce and becomes a more than usually valuable commodity. But we will attempt, as we have said, to do justice to this and other interesting questions suggested by the work before us on an early day.

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

POTTS'S TRAPS.

(*To the Editor of the* SANITARY RECORD.)

SIR,—In an article on 'Dip-traps for Houses,' in your number of Sept. 14, you object, and very properly so, to a dip-trap recommended by the *Builder's Weekly Reporter*. No one having a knowledge on the subject could recommend such an abomination. You recommend certain appliances for the purpose intended, but do not mention our trap. As I believe you are solely actuated by a desire to advance knowledge in this direction, and to give the public the benefit of any improvement in sanitary appliances, I can only suppose our trap (which has been advertised in your columns) has not come under your notice. It is recommended and approved by Dr. Richardson, Dr. Axford, Dr. Corfield, Mr. Robert Rawlinson, C.B., Mr. Eassie, and Mr. E. Turner, and received the only prize for traps at the Exhibition in connection with the British Medical Association meeting in Manchester.

Birmingham, September 27, 1877. J. C. POTTS.

[We print the above letter with pleasure, for the information it contains. We had the trap of Mr. Potts and Co. specially in our mind's eye when we penned the article, as 'having sufficient fall previous to just entering the syphon,' the lack of which renders a syphon apt to become stopped up.—ED.]

SANITARY INSPECTORS.

(*To the Editor of the* SANITARY RECORD.)

SIR,—I am one of those, as you see, who have assumed the name of 'Sanitary Inspector,' and by so doing have offended more than one, besides your correspondent, 'Medical Officer of Health,' and I am surprised that there should be any educated men in the Queen's dominions so thin-skinned as to complain of being called Mr. So-and-so, Officer of Health. I have been in office since the Act was passed in its present form, and the medical officer who was appointed at the same time as I was works harmoniously with me, without the formality of Mistering one and Esquiring each other, and although I may be only a nuisance inspector, I am as often addressed Esq. as I am Mr. I have now before me a letter lately received, 'On Her Majesty's service,' sent from Whitehall, London, and the Esq. is put after my name, and then follows Sanitary Inspector. But all this to me is of no moment. Whether I am addressed ——, Esq., Sanitary Inspector, or Mr. ——, Nuisance Inspector, is immaterial. The contents, the business matter, is the thing I have to attend to, and, so far as I have had an opportunity to form an opinion, with the generality of inspectors it is the same. I am afraid that your correspondent is one of those who has not succeeded in causing his patients to trouble the sorters at the Post-Office to dot Esquire after his name very often, hence this great grievance. Now after all how stand the facts in sanitary matters? who is most entitled to have Esquire attached to his name, 'health inspector' or the nuisance inspector? The nuisance inspector has to do the bulk of the work; if there is a closet, privy, or drain—stagnant filth, offensive effluvia, putrid meat, overcrowded and pestilential domiciles, or even an outbreak of infectious disease—the nuisance inspector, if he is faithful to his duty, has to face them all, and for every visit the medical officer of health pays to the majority of the above cases the inspector has to go twenty times, has to contend with all characters, face all opposition, and do his work manfully and fearlessly.

I am very glad to find that the Sanitary Institute of Great Britain is about to institute an 'examination.' I have longed for it, and felt the want of it, because I am fully convinced of the truth of the remarks you made on the letter of your correspondent—that when sanitary matters are better understood, the sanitary inspector will be looked upon as of more importance than he is at present; hence the necessity for him to have as much of mental, practical, and scientific knowledge as he can obtain, to meet all the various and onerous duties of his office. No one should accept such an office without being possessed of practical knowledge sufficient to meet any emergency. HUGH DAVIES.

Wrexham, October 2, 1877.

FROM the latest return issued by the Registrar-General, it appears that the mortality in Brighton during the week before last was at the rate of 14·8 per 1,000 per annum, the average rate for the country at large during that period being 20.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

BARTLETT, James, L.R.C.P. Edin., L.F.P.S. Glasg., L.S.A. Lond., has been appointed Medical Officer of Health for the No. 1 Sub-District of the Wareham and Purbeck Rural Sanitary District, and for the Owermoigne Sub-District of the Weymouth Rural Sanitary District.

BOWMAN, Mr. J., has been reappointed Inspector of Nuisances for the Driffield Rural Sanitary District at 52*l.* per ann.

BROWN, Mr. William, has been appointed Inspector of Nuisances for the Southowram Urban Sanitary District, Yorkshire, vice Howarth.

CLEMOW, Mr. John Francis, has been appointed Inspector of Nuisances for the St. Columb Major Rural Sanitary District, Cornwall, vice Howard, whose appointment has expired, at 50*l.* per ann.

EDWARDES, Edward Joshua, M.B. Univ. Lond., L.R.C.S. Edin., L.S.A. Lond., has been appointed Medical Officer of Health for the Llanfyllin Sub-district of the Llanfyllin Rural Sanitary District, vice Williams, resigned.

HITCHINS, Charles Vernon, M.R.C.S. Eng., L.S.A. Lond., has been reappointed Medical Officer of Health for the Weston-super-Mare Urban Sanitary District, at 45*l.* for one year.

LAW, Mr. Eli, has been appointed Inspector of Nuisances for the Hebden Bridge Urban, and Todmorden Rural, Sanitary Districts.

LAWSON, Joseph, M.B. Trin. Col. Dub., L.R.C.S. Irel. and L.M., has been appointed Medical Officer of Health for the Hebden Bridge Urban, and Todmorden Rural, Sanitary Districts.

LEWIS, Thomas Hope, M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the No. 1 Sub-District of the Carmarthen Rural Sanitary District, vice Lloyd, deceased.

MONCKTON, David Henry, M.D. Univ. Lond., F.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the Lichfield Rural Sanitary District, vice McCully, whose appointment has expired, at 100*l.* for one year.

SCOTCHBURN, Alfred, M.R.C.S. Eng., L.S.A. Lond., has been reappointed Medical Officer of Health for the Driffield Rural Sanitary District, at 80*l.* per ann.

SHELTON, Mr. Charles, has been appointed Inspector of Nuisances for the Ripley Urban Sanitary District, Derbyshire, vice Moss, deceased.

SIMS, Mr. Thomas, has been appointed Inspector of Nuisances for the Belper Urban Sanitary District, vice Parker, deceased, at 30*l.* per ann.

THOMAS, Mr. John Morgan, has been appointed Inspector of Nuisances for the Narberth Rural Sanitary District, vice Currie, resigned.

TIPPINS, Mr. Thomas, has been appointed Inspector of Nuisances for the Monmouth Urban Sanitary District, vice Wheeldon, resigned.

TURVEY, Mr. Jonas, has been appointed Surveyor and Inspector of Nuisances to the Romford Local Board and Urban Sanitary Authority, vice Hood resigned, at 130*l.* per ann. with residence.

VACANCIES.

BANBURY URBAN SANITARY DISTRICT. Medical Officer of Health. Inspector of Nuisances. Applications, 8th instant, to Thomas Pain, Clerk to the Authority.

CARLISLE, CITY OF, AND URBAN SANITARY DISTRICT. Inspector of Nuisances: 100*l.* per ann. Application, 11th instant, to the Chairman of the Health Committee, Town Hall.

DRAYTON RURAL SANITARY DISTRICT, Salop. Medical Officer of Health.

EAST DEREHAM URBAN SANITARY DISTRICT, Norfolk. Medical Officer of Health: 25*l.* per ann. Application, 6th instant, to James Saunders, Clerk to the Authority.

STAINES LOCAL BOARD AND URBAN SANITARY AUTHORITY, Middlesex. Clerk.

THORNTON URBAN SANITARY DISTRICT, Yorkshire. Medical Officer of Health: 27*l.* per ann. for three years. Inspector of Nuisances: 40*l.* per ann. for three years. Application, previous to 12th instant, to Samuel Wright, Clerk to the Authority, Bradford, Yorkshire.

TOWCESTER RURAL SANITARY DISTRICT. Medical Officer of Health. Application, 8th instant, to W. Whitton, Clerk to the Authority.

SANITARY PATENTS.

3254. An improved system of drainage. Thomas Jewell, Gordon Grove, Camberwell, Surrey.

3279. Improvements in gulleys or traps for drains, and in the mode of casting the same. Thomas Armstrong, South Crescent Chambers, Liverpool.

3311. An improved process or method of purifying gas. William Marriott, Huddersfield, Yorkshire.

3355. Improvements in filters and the fittings connected therewith. Henry Berlon Isidor Fürstenhagen, and Hermann Wildt, Bradford, Yorkshire.

ABSTRACTS OF SPECIFICATIONS.

509. Apparatus for inhaling medicated vapours, etc. W. Martindale.
This consists of a wide-mouthed vessel (the receiver) and a conical cover, with mouthpiece, the two forming an inner and an outer annular chamber. They communicate by openings below the level of the liquid, whose surface is in the outer chamber exposed to air.

952. Treating sewage. S. Hollyworth and R. Bailes.
This relates to preparation of acid solution of iron, also of copperas and dry copperas, in combination with slacked lime, for clarifying sewage. In some cases neutral sulphate or neutral muriate of iron is used with slacked lime.

1374. Chlorophyll. F. Lecomb and A. Guillemare.
This relates to imparting a green colour to preserved vegetables, fruits, etc, by scalding them with a solution prepared thus: Spinach, sorrel, and like plants are boiled with caustic soda; a chlorophyll lacquer is got by precipitating alum with the alkaline chlorophyll solution, and washed to eliminate soda; the soluble phosphates specially of soda, potash, or ammonia, or acid phosphates, or alkaline citrates, or double tartrates, are mixed with it, and water added.

4848. Treating sewage, etc. G. Rydill.
This consists in utilising the extract refuse acid chemical substances used in extracting vegetable substances from animal fibres, and the refuse alkali liquids used in cleansing, for deodorisation and precipitation of sewage water, etc.

4854. Ozone machines, etc. J. C. Mewburn.
A movable vertical tube of earthenware, unglazed except at the bottom, stands in water in a base dish of glazed ware, supported on legs, and having a short open central tube projecting a little way up in the other tube. On a rim at its lower end phosphorus is burnt. A porous earthenware cover, placed on the base dish, embraces the vertical tube, and in its sides are windows for inspecting the operation. Ozone passes through the walls of the central tube and the outer walls of the chamber, while the acid and other deleterious substances drop into the water below.

4961. Drying manure, etc. J. T. Hoyne.
Cold air is forced through a cluster of tubes surrounded by superheated steam in a cylindrical case, whence, heated, it passes to a horizontal central distributing pipe, then through perforated transverse discharge pipes to equalising pipes. Issuing from the apertures in its passage, it acts on the materials to be dried, which is placed over the pipes.

4935. Water-closets and latrines. G. Jennings.
This relates to improvements on No. 14,273 in 1852, and No. 1,504 in 1858; in the former a projecting rib is formed on the interior of the front of the pan to direct the stream; in the latter, the valve is made with solid stone, and an overflow passage is formed from the valve chamber into the trap below the pan, etc. Again, a valve for regulating the supply of water is arranged to be moved downwards from its seat by a weighted lever handle, when raised. From below the valve a short hollow stem descends to a flexible diaphragm across a metal chamber. The pressure of water above the diaphragm tends to keep the valve down and open till balanced by pressure of water below the diaphragm, admitted from above by a passage in which is a tap. When the valve is moved downwards, water passes up through the metal stem, and enters the chamber above the diaphragm, but cannot return through the stem. Latrines are divided horizontally into two parts connected by pipes, etc.

5014. Wash-basins, etc. W. Morgan-Brown.
The basin is made with a bell-trap chamber below its proper bottom, in which bottom is a removable section, which allows access to the chamber and removal of the bell cover up through the basin without disconnecting fixtures. An overflow pipe discharges first into the bell-trap chamber. There is a coupling collar on the waste-pipe of the bell-trap. The same principle is applied to urinals and sinks.

5037. Stoves. R. S. Oakeshot.
Fresh air is brought from the outside of a building to a chamber at the base of a stove, which is cased in iron, with an outer iron case. Tubes passing up between the cases deliver the warm air over the top into the room.

'THE DUPLEX CAR is the lightest, prettiest, best constructed, and best appointed car that has ever been brought under our notice.'—*Church Review*. Inventors, Patentees, and Builders: S. HATCHARD & Co., General Funeral Furnishers, 47 Crawford Street, W. Miniature Duplex Cars (used open or closed, drawn by men or horse) built for the country.—ADVT.

NOTICE.

THE SANITARY RECORD *is published every Friday morning, and may be ordered direct from the Publishers. Annual Subscription, 17s. 4d.; free by post, 19s. 6d.*

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Original Papers.

ON THE WATER-SUPPLY OF SEASIDE WATERING-PLACES.

BY G. W. WIGNER, F.C.S.

(*Continued from p. 216.*)

AT an earlier period in these papers I referred to the supply of Littlehampton, and gave the analyses of samples from two wells in that place, viz., F well and B well. Both of these were emphatically condemned in these words: 'It would, therefore, be difficult to find two waters more thoroughly contaminated than these;' and I concluded by saying: 'If the authorities do not take the matter up themselves the Local Government Board should be called upon to interfere.' I little thought as I wrote this sentence how opportune it was.

The local board of health!! have had a meeting, at which they received a report from their medical officer, and the chairman spoke in a very angry strain about the 'vast deal of harm' which was being done by the statements in the SANITARY RECORD, and mentioned a case where a family had taken alarm at a house which was supplied with excellent (?) water; and finally the members of the board so far forgot their position as gentlemen and supposed guardians of the public health as to direct an application to their medical officer to reply to the *untruthful* statements in this journal. Of course I do not expect that any medical officer, with respect for his proper position as a professional sanitarian, would act on any such instructions, he would rather act on his own judgment of the character of the wells; indeed, he has already done so, and I will in a moment refer to his report.

One very satisfactory fact was brought to light by the discussion, for it appears that the local board knew the wells in the town, including the two from which I obtained samples, were bad, because the board had already 'taken the matter up themselves,' and are now engaged in sinking a deep bore well. Putting the angry remarks side by side with this fact, which was only incidentally allowed to come out, no one can doubt where the truth lies.

Now, as to the medical officer's report, Dr. Kelly writes very guardedly; he expresses no collective opinion on the results, but gives one or two facts which are interesting; first, the wells are only from 11 to 14 ft. deep, and second, they are close to a tidal river. He does not say how far they are from the sea, but I should think they are certainly not half a mile distant; further, Dr. Kelly states 'the depth varies with the state of the tide,' i.e., the wells themselves are tidal.

Dr. Kelly advances some curious arguments in favour of the wells; for instance, he says that seven adults and four children have had water from one of the wells for periods varying from six months to two years. I should suppose they drink but little water, but the fact is interesting as a specimen of the way in which a healthy human frame can withstand for months the injurious effects of a fluid yielding ·0141 grains of albuminoid ammonia per gallon, i.e., ·201 parts per million, and 3·43 grains of nitrogen as nitrates per gallon, equal, supposing it all existed in that form, to more than twenty grains of nitrate of soda per gallon.

As to the other well, Dr. Kelly reports that it supplies fifteen adults and eleven children, and that they are all in good health. I trust they may continue so, but I fear that the use of water containing as suspended matter pieces of skin and muscular fibre will hardly tend to this end.

I do not know whether the residents in these houses take visitors, but, if they do not, visitors certainly do stay at houses which are similarly supplied, and though the natives may perhaps use such waters as these without recognising the injurious results, yet the effects on visitors who go to the seaside, having enfeebled constitutions which need renovating may in some cases prove to be terrible.

I quite agree with Dr. Kelly that 'if the water be of good quality it matters not how many houses are supplied by a well;' his axiom, however, does not apply here, because in these cases the water is not 'of good quality;' on the contrary, it is so bad that it is fairly classed as sewage. Unfortunately, this has too often been the case with wells which supply three or four houses each.

Still, it is eminently satisfactory to find the authorities are really endeavouring to bring about a better state of things, and as soon as the new well is sunk I will examine a sample of the water and report on it.

Leaving this question, and continuing my course round the coast, the next town I come to is BLACKPOOL, which has a normal population of about 6,000. As far as I can ascertain from the medical officer and other sources, the North Shore is supplied from springs on the hills at the back of the town, the water from the springs being pumped into Grizedale reservoir, while the South Shore is supplied from other springs in the same range of hills, the water from there being pumped into the Weston reservoir. The Grizedale reservoir has been leaking badly of late, and consequently it is probable that these samples may not really have come from the sources to which I refer them. I have obtained a sample from each Shore, both of them being drawn from the mains on August 31. The results, which it will be seen are similar in general character, were as follows:

	North Shore. Grains per gallon.	South Shore. Grains per gallon.
Total solid matter	5·60	6·40
Loss on ignition after deducting combined carbonic acid	1·40	2·20
Lead and copper—none.		
Iron—heavy traces.		
Chlorine calculated as chloride of sodium	1·29	1·29
Hardness before boiling, North Shore, 1·3°; South Shore, 1·8° (Clark's scale)		
Hardness after boiling, North Shore, 1·3°; South Shore, 1·8° (Clark's scale)		
Nitrogen as ammonia	0·0020	0·0023
,, albuminoid ammonia	0·0048	0·0053
,, nitrates	0·0490	0·0350
,, nitrites	0·0070	0·0070
Total nitrogen in these four forms	0·0628	0·0496
Oxygen absorbed by organic matter	0·2780	0·2260

The colour of the North Shore sample was that of an almost opaque Irish whisky, the opacity being due to the presence of a heavy quantity of suspended matter. The sample from the South Shore was free from suspended matter, but the yellow colour was still more marked. Both samples were alike in

having a smell and taste of a peaty character, and the microscope showed in each case an excessive proportion of bacteria and vibrions. Although, therefore, if considered simply from the mineral point of view this water is a good one, yet it is clearly contaminated with organic matter, which has most probably a vegetable origin, and the oxygen absorbed is exceedingly high. The water on the North Shore is evidently very imperfectly filtered, even if it is filtered at all. It certainly needs it, and I commend the matter to the immediate attention of the authorities, whose difficulty may be partly owing to the leaky reservoir.

LYTHAM is the next place to which I come, and here again, as at Blackpool, I have had some difficulty in procuring reliable details as to the character of the source from which the water has been drawn, but I know it is supplied by the same company which supplies Blackpool. My assistant drew a sample from the mains on August 31, the results of which were as follows :

	Grains per gallon.
Total solid matter	5·40
Loss on ignition after deducting combined carbonic acid	1·00
Lead and copper—none.	
Iron—heavy traces.	
Chlorine calculated as chloride of sodium	1·40
Hardness before boiling, 1·7° (Clark's scale)	
,, after boiling, 1·7° ,, ,,	
Nitrogen as ammonia	0·0030
,, albuminoid ammonia	0·0054
,, nitrates	0·0250
,, nitrites	traces
Total nitrogen in these four forms	0·0334
Oxygen absorbed by organic matter	0·2100

It will be seen that the total solids are very low in this sample, and it is also a very soft water. It is evidently almost identical with the water supplied to Blackpool. The albuminoid ammonia is above that of a first-class water, and the oxygen absorbed is again exceedingly high, higher in fact than the worst well at Bognor, and nearly as high as in the supply of Margate. The sample was free from suspended matter, but it had a dirty yellow colour, and when heated it had an unpleasant smell and taste, which, although not very marked, certainly seemed to resemble peaty matter. The microscopical results accorded with this view.

In some respects this water is good, but on taking all the facts into consideration, it can only be classed as a low second-rate sample.

SOUTHPORT has a population of nearly 20,000, but I have again to regret that the surveyor has not replied to my request for information as to the source from which the water is derived, and the other details mentioned in my list of questions. As far as I could ascertain the company give a constant supply which they obtain from hills at Ormskirk and Scarisbrick.

I obtained two samples, one of which was drawn from the mains in Southport and the other from the mains in Birkdale, which is a suburb of the former place, and is said to be supplied from the same source; the results were as follows :

	Southport. Grains per gallon.	Birkdale. Grains per gallon.
Total solid matter	19·50	20·90
Loss on ignition after deducting combined carbonic acid	5·06	5·04
Lead and copper—none.		
Iron—traces.		
Chlorine calculated as chloride of sodium	2·93	2·71
Hardness before boiling, Southport, 7·5° ; Birkdale, 8·0° (Clark's scale)		
Hardness after boiling, Southport, 6·5° ; Birkdale 6·5° (Clark's scale)		
Nitrogen as ammonia	0·0013	0·0021
,, albuminoid ammonia	0·0023	0·0030
,, nitrates	0·0420	0·0840
,, nitrites	none	traces
Total nitrogen in these four forms	0·0456	0·0891
Oxygen absorbed by organic matter.	0·0500	0·0200

The Southport sample was entirely free from suspended matter, but that from Birkdale showed traces of sediment which appeared to be of a chalky character. Both samples were perfectly free from taste and smell, and the figures are sufficiently near to show that they resemble one another generally in character. As regards nitrogenous compounds the results are satisfactory, and the samples are by no means excessively hard. The loss on ignition is certainly too high, but as the other features are fairly satisfactory, I cannot condemn the waters for this point only. They must be looked upon as good waters.

WATERLOO, near Liverpool, is only a small place, and has, I am informed, only an intermittent supply, which is said to be derived from springs. I obtained a sample, which was drawn from the mains on Sept. 31, and the results were as follows :

	Grains per gallon.
Total solid matter	24·30
Loss on ignition after deducting combined carbonic acid	0·90
Lead and copper—none.	
Iron—slight trace.	
Chlorine, calculated as chloride of sodium	4·45
Hardness before boiling, 8·0° (Clark's scale)	
,, after boiling, 8·0° ,, ,,	
Nitrogen as ammonia	0·0038
,, albuminoid ammonia	0·0030
,, nitrates	0·3740
,, nitrites	none
Total nitrogen in these four forms	0·3808
Oxygen absorbed by organic matter	0·0400

The sample contained very heavy traces of suspended matter, consisting mainly of chalky and aluminous matters. This rendered the water slightly milky, but the pale blue tint of pure water was still perceptible. The microscopical examination did not reveal the presence of any impurities beyond the traces of amorphous suspended matter already referred to. The smell was perfectly satisfactory, but there was a trace of objectionable taste of a saline character, which might possibly be due to the proportion of nitrates present, and although this proportion is not excessive, yet it is far higher than in neighbouring places.

NEW BRIGHTON is another small place, and is said to have only an intermittent supply. My informant says it is derived from a deep well near Birkenhead. My sample was drawn from the mains on August 31, and gave the following results :

	Grains per gallon.
Total solid matter	14·70
Loss on ignition after deducting combined carbonic acid	2·60
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	5·38
Hardness before boiling, 4·8° (Clark's scale)	
,, after boiling, 4·8° ,, ,,	
Nitrogen as ammonia	0·0013
,, albuminoid ammonia	0·0014
,, nitrates	0·2060
,, nitrites	traces
Total nitrogen in these four forms	0·2087
Oxygen absorbed by organic matter	0·0120

The sample was quite free from suspended matter, and of a good pale blue colour. The smell and taste were perfectly satisfactory. By the microscopical examination I could not detect any improper substances present. It is a soft water, which has evidently been well aerated, and only shows traces of nitrites. The total solids and salts are rather higher, however, than might be expected from the other figures of the analysis. It is a good water.

I have now finished the Lancashire coast, and pass on into Wales; and the first place here of any importance as a watering-place on the North Wales coast is

RHYL.—This town is said to be supplied by a water company, who get their supply from hills at Llanivydd. My sample was drawn from the mains on September 1, and the results are as follows:

	Grains per gallon.
Total solid matter	8·30
Loss on ignition after deducting combined carbonic acid	1·30
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	1·99
Hardness before boiling, 3·2° (Clark's scale)	
,, after boiling, 3·2° ,, ,,	
Nitrogen as ammonia	0·0022
,, albuminoid ammonia	0·0047
,, nitrates	0·0520
,, nitrites	traces
Total nitrogen in these four forms	0·0589
Oxygen absorbed by organic matter	0·1000

This water-supply, therefore, is low in total solids, and the total nitrogen in combination is also low; while, on the other hand, the albuminoid ammonia although low in itself is relatively high as compared with the total nitrogen. The water had a slight yellow tint, but was free from suspended matter; and it had a decidedly unpleasant taste and smell, which resembled decaying leaves or vegetable matter. The microscopical examination showed the presence of much decomposing vegetable matter, and the amount of oxygen absorbed is also high. Looking at all the results the water must be classed as a second-class one.

ABERGELE is said to have a constant supply derived from the Llanivydd water works. The source of the supply is said to be natural springs in the hills. The analysis of the water was as follows:

	Grains per gallon.
Total solid matter	8·60
Loss on ignition after deducting combined carbonic acid	1·02
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	1·99
Hardness before boiling, 4·6° (Clark's scale)	
,, after boiling, 3·5° ,, ,,	
Nitrogen as ammonia	0·0035
,, albuminoid ammonia	0·0045
,, nitrates	0·0700
,, nitrites	traces
Total nitrogen in these four forms	0·0780
Oxygen absorbed by organic matter	0·0860

The sample had rather a dirty brown colour and when heated to the temperature of 100° Fahr. it had a decidedly offensive smell but was free from taste. The microscopical results were fairly satisfactory. There was a great deal of amorphous matter, which is of course fully accounted for by the dirty brown colour of the water, and there were a good many fragments of vegetable fibre, but nothing which could be directly traced to animal contamination. It appears probable that this is from the same source as the Rhyl supply, and taking all the results into account this water must be passed as a second-class one.

Unfortunately, however, the inhabitants of Abergele do not all avail themselves of the water-supply, and I had a sample from a private well in that place—the water from which is considered so good that the owners of the well are in the habit of drinking it because they think it nicer than the public supply. The results were as follows:

	Grains per gallon.
Total solid matter	106·60
Loss on ignition after deducting combined carbonic acid	13·36
Lead and copper—none.	
Iron—slight trace.	
Chlorine calculated as chloride of sodium	26·91
Hardness before boiling, 34·0° (Clark's scale)	
,, after boiling, 23·0° ,, ,,	
Nitrogen as ammonia	0·0018
,, albuminoid ammonia	0·0106
,, nitrates	3·7400
,, nitrites	0·0040
Total nitrogen in these four forms	3·7564
Oxygen absorbed by organic matter	0·0780

This sample had, as might be expected from the figures of the analysis, a saline taste. It was fairly free from suspended matter, and the colour on the whole was satisfactory; but the microscopical examination disclosed the presence of large quantities of decomposing animal matter; and a large number of crystals of urates, and it was difficult to find a field under the microscope which did not contain some dozen or more living animalculæ. Therefore although the albuminoid ammonia alone is only just sufficient to carry this water into the third class, the excessive proportion of nitrates, together with the results of the microscopical examination, are more than sufficient to condemn this water as sewage.

PENSARN has a constant supply which is also said to be derived from Llanivydd. My sample was drawn from the mains on September 1, and the results of the analysis are as follows:

	Grains per gallon.
Total solid matter	12·00
Loss on ignition after deducting combined carbonic acid	3·37
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	2·11

	Grains per gallon.
Hardness before boiling, 3·5° (Clark's scale)	
,, after boiling, 3·2° ,, ,,	
Nitrogen as ammonia	0·0025
,, albuminoid ammonia . .	0·0047
,, nitrates	0·0420
,, nitrites	traces
Total nitrogen in these four forms . .	0·0492
Oxygen absorbed by organic matter . .	0·0580

The colour of the water was a dirty greenish yellow; when warmed, the smell and taste were offensive and flat, like rain water, and there were traces of suspended matter. The microscopical examination showed the presence of much amorphous suspended matter, and of some fibrous matter evidently of vegetable structure. I have no reliable particulars as to the source from which this water is derived, but I certainly am of opinion that it must come from hills which are of a peaty or boggy character. I have, however, tested my sample as carefully as possible, to see if it would give any indications of a peaty origin, but I cannot detect any. Although this water does in some respects very greatly resemble the other Llanivydd supplies, it is more highly contaminated with vegetable matter.

LLANDUDNO, although comparatively small in proportion, is probably one of the most fashionable watering-places in Wales. The population, according to the statement in the census return is under 3,000. The surveyor writes to say that the water-supply has only recently been transferred from a company to the Improvement Commissioners of the town, and that therefore at present he is unable to answer my queries. He further adds that they are about commencing a scheme to supply the town with water from Llyndulyn, a place about fourteen miles off, which will give them an unlimited supply of pure water. At present as far as my inquiries on the spot enable me to judge, the supply is drawn from springs on the Great Orme's Head; and the following were the results of the analysis of a sample drawn on September 1, from the mains in the town:

	Grains per gallon.
Total solid matter	31·70
Loss on ignition after deducting combined carbonic acid	9·83
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium .	6·90
Hardness before boiling, 8·8° (Clark's scale)	
,, after boiling, 7·5° ,, ,,	
Nitrogen as ammonia	0·0040
,, albuminoid ammonia . .	0·0035
,, nitrates	0·2400
,, nitrites	0·0040
Total nitrogen in these four forms . .	0·2515
Oxygen absorbed by organic matter . .	0·0140

The water had a fair colour, but when warmed a most offensive smell and taste of decomposing vegetable matter. It was nearly free from suspended matter, but the microscopical appearance was extremely unsatisfactory. It is quite clear therefore that the authorities of Llandudno are not moving in this matter any too soon, and that they had better as soon as possible complete the arrangements for their improved supply, and so make this watering-place as popular as it otherwise deserves to be.

In my next paper I shall refer to the supplies of Penmanmaur, Bangor, Beaumaris, Carnarvon, Pwlheli, Portmadoc, Barmouth, and Aberystwith.

THE EFFECTS OF GROWING VEGETATION UPON HUMAN HEALTH.*

BY W. EASSIE, C.E., F.L.S.

THE influence of plant life upon animal life for good and for evil has never obtained sufficient attention, which is the more wonderful when we consider their close relationship. Animals constantly supply carbonic acid upon which plants feed, and they exhale oxygen which is the vital air of animals.

Wonderful stories have been told, from the Dutch surgeon downwards, about that Javanese member of the Bread Fruit tribe called the Upas, but such ridiculous stories have become rarer with increased navigation. Still there are undoubtedly members of the vegetable kingdom which prove more or less hurtful to man, even when not absorbed into the system as food. There is, for instance, the manchineel with its milky venomous juice, and which is reported on fair authority to cover the skin with blisters should a shower cause it to drip from the leaves upon a sleeper underneath it. There is also the poisonous sumach, which causes painful ulcers upon those who come in contact with the sap that flows from its easily wounded bark. Many instances of a more or less veritable character might be enumerated; but this does not enter into the scope of my paper. I seek rather to refer to the active influences of vegetable life in an ordinary way, as, for example, the reason why it is unsafe to sleep in a closed conservatory full of plants. Admiral Spratt relates a case where three English officers caught a remittent fever of a severe form whilst sleeping in a Maltese vineyard. What was the cause of this seizure? We can only imagine that in the night time the plants breathe carbonic acid as usual; but during the repose of the plant, much of it passes off again unchanged. It is different when the sun arises, and the plant, so to speak, wakens up hungrily, for then the plant decomposes the carbonic acid, secretes the carbon which it never parts with, and pours out the pure oxygen gas into the atmosphere.

Into the vexed question as to whether or not the germs of disease can be created *de novo* I will not seek to enter, for the minute pathology of contagion is still somewhat of a sealed book. It may be taken for granted that the motes floating in air contain the germs of vegetation, and that they occasionally sail about in small compact clouds seeking fields for propagation. The more innocuous among them prove harmless; but when they meet with hurtful gases, or unite with more organised bodies in a diseased state, they generate and multiply to an alarming extent, even to the producing of an epidemic. The boundary line between the animal and vegetable kingdoms has been almost effaced in modern times, and it is difficult to say where the one ends, and the other begins. We are told, however, that the germal matter of the lowest forms of vegetable life in water is universal, and that they are in a higher state of development there than in the air.

The fungi exercise an important influence in inducing a diseased condition in animals. When the human frame is not altogether healthy or able to banish the intruder, these forms may even pass into the minute cells of the lungs. One species is an

* Read at the Congress of the Sanitary Institute of Great Britain, Leamington, Oct., 1877.

almost constant attendant on cancerous affections of the stomach. A few spores of a certain fungus when rubbed into the skin have been known to produce a serious skin disease, and Dr. Lowe has induced skin diseases by inoculation with the granules of yeast. Fungi have always been considered as a great factor in the spread of disease. But even when they have found lodgment in the mucous membranes they cannot be said to originate disease, though they may aggravate it. They are almost omnipresent in nature, and their spores have been detected in flakes of snow, in the Trade Wind dust, and in the wilderness. They can also for the most part endure the extremes of temperature without losing their reproductive power. The spores are very commonly found in the dejections of cholera, and the complicated bodies which constantly accompanied the cholera in its last march through the West of England were supposed to be fungoid in origin. Be this as it may, these lower forms of vegetable life often cause derangement in the animal economy. The deleterious effect of the ergot, for instance, is well known, and the presence of ergot in fresh dried sausages, and in mouldy provisions, produced by ergot in bread have sometimes proved fatal. I might instance also the danger to health which results from the growth and spread of this form of life under the floorings of houses. I have known barrowsful of this rank vegetation taken from between the joists of a drawing-room, and I have seen flagstones which have been moved out of their place by such underground growths. I cannot say that these engendered any complaint beyond a feeling of annoyance, but what might have resulted in the long run I cannot say. Some of the fungi at a certain stage are, however, especially loathsome and create nausea, and even sickness, in the passer by. For instance, the *phallus* dissolves into a horribly fetid mass, and the *clathrus* emits a most abominable and disgusting smell.

Venturing a little higher up the vegetable scale, let us just notice the influence of low plant life upon water. All water exposed to the air contains the germs of vegetable life. Microscopic forms of algæ, etc., are common in nearly all kinds of water. These perish, and are found in a condition of ferment and putrefaction, the reception of which into the system produces an apparent tendency towards the quicker inception of disease. The rapid growth of confervæ upon water is also very noticeable, and indicates when water can scarcely be drunk with impunity. I have seen cisterns in the back yards of cottages, exposed to the air without lids, which have been covered with low growths like a duck pond, and owing to the infrequency of their being cleaned out, full of decayed vegetable matter at the bottom. For a time such water may be consumed without risk, but given certain conditions of a poisoned atmosphere, it is impossible to say how long this might continue so. Perhaps if the supply were not daily changed, evil might invariably result. Cases of diarrhœa have been traced to the use of the intermittent water-supply of uncleaned water-butts which have been neglected in this way. I have lately inspected some farms in the western counties where the supply of water is from ponds close to the house, and no illness to the inmates has followed, but I attribute that to the use of filters, and chiefly to the presence of frogs and other animals. All who have kept an aquarium know that upon the maintenance of an equilibrium of animal and vegetable life depends the preservation of the water in a reasonable state of purity Hence it is necessary to introduce fish and testacea into the tank, and to keep it properly in the shade; and hence, also, the introduction by country people of the batrachia into their fern-lined collection wells. The algoid forms which first appear in water, are but the precursors of others which take a higher development.

We have in our country a curious affection which passes under the name of hay fever—a malady usually concurrent with the flowering of still higher forms of plant-life such as rye and wheat, and especially of the sweet-scented vernal grass, the sweet-scented soft grass, and the rye grass. The attacks generally coincide with the ripening of these plants, and it is said to be due to the liberation of benzoic acid which exists especially in the two first named grasses during the summer heats. Chemists have found that the exhalations arising during the preparation of this acid cause the same irritation in the throat, and the same violent paroxysms of sneezing and coughing. In America similar affections are produced in persons predisposed to them, by the scent of roses, and they term there the peculiar kinds of catarrh and asthma so induced, rose fever. In India whilst the Mango is in bloom similar distressing ailments prevail between February and March among Europeans, and beans, nettles, lilacs, and elders when in a flowering state affect other constitutions in a similar manner. In delicate states of health some people also suffer in this way when they have inhaled the odour of perishing violets, the water in which flowers have been preserved, of larch woods and the like. The chief factor is undoubtedly atmospheric heat. When once the frame has become subjected to this ailment, its influence increases in activity as the years roll on, and the only cure would appear to consist in the removal of the patient from the neighbourhood—say to the crowded town or to the seaside. A study of this peculiar malady has been made by Messrs. Pirrie and Smith, and a case is noticed where the mere passing of a cart of new mown hay sufficed to bring it on, with all its worst symptoms. It has even been known to terminate in typhus fever.

We now pass naturally to the subject of miasma, which was understood from the earliest ages. On one of the coins of Selinus, the river god is shown offering a libation to Esculapius—a marsh bird serving as an adjunct—the meaning being that the people suffered from pestilence until the first sanitary engineer, Empedocles, drained the neighbouring marsh. Atmospheric heat is here again the chief factor. The marshes which cause malaria are seldom those which grow peat or brushwood, willows and alders, but rather those composed of reeds, rushes, algæ, and mosses; seldom those in cold countries which freeze, but rather those of hot countries which partially dry up in the summer. Thus I caught a severe ague on the banks of the Jordan, in a very hot July, by merely sleeping outside the tent. In the fens of our own country, where reeds, sedges, and tall grasses prevail, agues are far from unknown even yet, but it is in the mouths of tropical rivers, in the mangrove woods, and in the cypress swamps of the old and new worlds, where this disease reigns paramount. When the vegetable matters are driven down rivers, and are caught in brackish waters, to decay in contact with its salts, sulphuretted hydrogen is formed, and the danger intensified. The jungle fevers of India strike down

the natives, and more than decimate the Europeans. In tropical climates it mostly prevails at the commencement of the rainy season, and after its termination, and long-continued heats increase the power of the poison which is not to be detected by the senses or discovered by chemical tests. The winds have been known to carry malaria even to the upper grounds, and in Italy it was borne from a lake to a convent situated upon a hill some three miles distant. Dr. Hamilton mentions a place in British Honduras, where barracks were built on the delta of a river which drained a large tract of swamp, and where in consequence malarious diseases prevailed to an enormous extent. When the sea breezes blew and drove the germs back up the river, the place was fairly healthy, but the land wind always brought back its fearful load. Nothing but thorough drainage and a destruction of the swamp vegetation, will radically remove this fever pest, although in most cases the removal of one's habitation to the higher grounds will bring alleviation. Thus, at Allahabad, in India, which is nearly surrounded by the Ganges, malarious fevers prevailed among the troops when the barracks remained on the low ground, and ceased to attack them when the men were removed to an elevation. Woods sometimes act as screens, and in Italy fevers have been known to become prevalent on the cutting down of certain belts of vegetation; but these, at best, are precarious safeguards.

When a new country is being explored, and its wood cut down, the soil is exposed to the full action of the sun, and malaria produced. The ploughing up of meadow lands, and the drainage of ponds and lakes, will also engender it. When the railway was laid down between Colon and Panama, the mortality due to the disturbance of the soil was simply enormous. Dr. Hawkes relates a case in which an attack of ague occurred to a lady merely by digging up a moss-grown gravel walk under her sitting-room. I have nowhere alluded to the direct effects of decaying vegetation upon human life, because that would require a special paper. I will, however, instance two cases which bear upon an ordinary habitation. One was an attack of typhoidal diarrhœa, traced by Dr. Mackintosh to a well in which some rotten turnips were discovered. The other came under my notice in Gloucester, and this was the case of a fellow geologist, who was accustomed to clean his fossils in a summer-house in the garden. An unpleasant odour made itself manifest from some decaying heads of brocoli near him, but he took no notice of it for some days, and the result was a typhus fever of the very worst type, during which his life was despaired of.

And now a word concerning trees, which screen the soil from the sun like so many parasols, diminish the temperature by evaporation of moisture from the leaf, and preserve a proper circulation of that necessary moisture. Without them the rain would descend headlong to the river beds, and rush in torrents to the sea. Without them there would be little percolation into the soil, certainly insufficient to supply our underground springs. The countries in which trees have been remorselessly felled have invariably suffered owing to the meteorological changes which ensued. About the year 1490, the Guadalquivir Valley supported about seven millions of robust men, but after the disappearance of the live oak and chestnut groves from the heights above, the population dwindled to 1¼ millions of cadaverous people forced to toil upon sandy and barren land. The effect of forestal destruction may be witnessed also on most of the continental rivers, for during the last fifty years the Elbe and the Oder have fallen 17 inches, the Rhine 24, the Vistula 26, and the Danube at Orsova 55 inches, all this accompanied by a corresponding diminution of the discharges from springs. And not only do trees from their stature greatly prevent the evaporation of what moisture falls, but even woody scrub also serves as a means of attracting and condensing the atmospheric moisture. Owing to the demolition of the dwarf vegetation on the hills of the North-Western Provinces of India, by the freebooters about the decline of the Mahomedan Empire, these hills once covered with a good depth of soil are now denuded and sterile to a degree. This disgraceful state of things is still proceeding even under British rule, and the people of Bangalore have now some 30 miles to travel before they can reach the jungle to cut down wood which not many years ago came within 10 miles of this city. Much wiser are they in Egypt. There, the rainfall owing to the planting of date palms and olive trees has nearly doubled. In the Soudan the rain gauge in 1820 registered only a maximum of 9 inches, and now it indicates a yearly average of 16 inches. The temperature of the table land of the Wady-Halfa, owing to the planting of currants and mulberries, has also been rendered so much less oppressive that it has almost become a by-word. Surely we should take a lesson for India and Canada and Australia from this, and, as in Germany, our laws should take care that the yearly growth balances the consumption. Our forests should reasonably be re-created and maintained, even if not a particle of wood some day enters into the composition of our navy. In New York State, the inhabitants obtain a rebate of highway tax equal to a dollar for every four elms, maples, locust, or fruit trees which they plant along the roads, and this is the proper way to restore the balance. We should even pay for a careful search into the adaptability of certain trees to certain soils. Who knows the limit at which trees benefit man as well as the earth, or the entirety of good results which accrue to London only from her scattered parks? We are even told by Dr. Buchan that the hereditary leprosy and other diseases of the Nile Valley are unknown in Abyssinia, some one hundred geographical miles nearer the equator, owing to the timbering there. In the matter of famine, too, this is greatly accelerated in India by the want of shelter and the climatic improvements which result to the grasses and the straws of all crops grown in the vicinity of trees.

In conclusion, we can point to the beneficial influence exercised by certain trees over certain diseases, but I will only instance one example, the Eucalyptus, or blue-gum tree, and its febrifugal qualities now so well established. When introduced at the Cape of Good Hope, these trees altogether changed the climatic conditions of the unhealthy forests in that colony, and miasma disappeared as if by magic. In the Campagna of Rome, the marshy exhalations have been nearly destroyed in many places, and in the fen districts of England the paludal fevers have been diminished by this natural therapeutical agent. An instance is recorded from Sussex, where a malarial fever, brought from Rome, ceased to reappear after the gentleman planted a few of these trees under his casement window. Dr. Bertherand, who received reports from thirty localities in Algeria, writes in equally favourable terms

of this tree. At the great iron mines of Mokta-el-Hadid, the first set of workmen perished from miasmatic causes, but when, from 1868 to 1870, some 100,000 of these trees were planted by the Company, the next batch of men were able to reside altogether upon the premises. Another case is cited, concerning a farm some twenty miles from Algiers, where 13,000 of the Eucalyptus trees were planted during the commencement of the year, and when the regular fever set in not a case occurred in the near neighbourhood. The effect is said to be due to the rapidity with which they absorb moisture, and also to the presence of an essential oil which is exhaled from the leaves, and which is freely emitted when there is a breath of wind. It is a fast growing tree, and will attain in seven summers the height that an oak tree can only reach after a lapse of twenty years.

One word more, and that is to the equally happy effects produced by some flowering plants—the sunflower, for instance. This will absorb impure gases and nitrogen quicker than any other known plant, and will evaporate as much as a quart of water daily. On the banks of the Scheldt, a landowner who sowed the plant extensively on his estate, escaped altogether the miasmatic fevers which prevailed on the estates all around him. General Sherman, who also grew the sun-flower extensively on the Roman marshes, noticed upon one occasion that a village close by his residence was visited by fatal attacks of fever, but that owing to the sixty plants which he had sown in his garden, his house altogether escaped. These are well authenticated cases, and ought to make us reflect. Nor are mere flowers to be despised, for, according to Professor Mantegazza, the active principle of oxygen, which is ozone, and an oxidant, disinfectant and deodoriser combined, is generated largely by all plants possessing aromatic odours, and is thrown off under the sun's rays. The scent given off also by lavender, sage, and rosemary is said to be efficacious in cases of plague. Assuredly we are only in the very alphabet of economical botany.

THE

SANITARY RECORD.

FRIDAY, OCTOBER 12, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

Special Reports.

THE CONGRESS OF THE SANITARY INSTITUTE OF GREAT BRITAIN.

The following are some of the principal papers read at this Congress, held at Leamington last week. We shall continue the publication of others next week.

'THE GLANDULAR ORIGIN OF CONTAGIOUS DISEASES.
By BENJAMIN W. RICHARDSON, M.D., F.R.S.

Dr. Richardson commenced by referring to a lecture which he delivered ten years ago in Leamington, on the occasion of a congress being held there to discuss the subject of the disposal of sewage. This lecture, he said, was based on a series of experimental researches which for some years previously he had been carrying out on the question of the mode of production and communication of those diseases which were anciently called 'pestilences,' but were now called 'communicable,' or 'spreading' diseases. He did not think that a health congress like the present could do better than recall attention to this same subject. The suppression of plagues, he continued, is one of the grandest and supremest efforts of the sanitary reformer. The suppression can never be accomplished until all educated persons understand the advances of modern science as to the cause and mode of origin, and mode of propagation of these diseases. Whatever, therefore, tends to strike out light of knowledge on these subjects tends to elucidate, and though the spark lighted may go out again, it may help to show the way. He then proceeded to explain at length the discoveries he had made to show that the fluids secreted during various stages of some communicable diseases were capable of propagating disease, and it was proved, he said, that a definite fever could be produced in an inferior animal by the fluid secreted from a patient suffering with that fever. He classed the diseases produced by organic poisons as septinous instead of zymotic, he preferring the word septine for this poison. The diseases thus named are small-pox, measles, scarlet fever, diphtheria, typhus fever, typhoid fever, erysipelas, hospital fever, puerperal fever (or the fever which occurs to women in child-bed), cholera, yellow fever, ague, glanders, boil and carbuncle, infectious ophthalmia. He explained the nature of these organic poisons, the mode in which they escaped from the patient by secretions, and how these poisons might be destroyed. He then touched upon the 'so-called germ theory of disease.' This hypothesis, for it was false to designate it as a 'theory,' was very old indeed. He added 'There is nothing whatever in fact in the clinical history of plagues that connects them with the hypothesis of an origin from germs produced without the body and entering it to fertilise it and create a decomposition. When I say there is nothing, I mean there is nothing except the analogy of which I have spoken above, and even that breaks down, for the analogy of a fertilisation of a field by seed means always a definite process of fructification and of results from it: whereas in the history of epidemic plagues there is no such definition. The germ hypothesis fails, however, on other grounds than the clinical. If it were true that living germs possessing an independent growth and vitality enter the animal body, that every disease of a communicable kind is due to its own external living germ, and that the germs continue to multiply and increase by an independent action of their own—if this be indeed true, why do the germs after a certain time cease to multiply and allow the sick person to recover. Why do they not go on multiplying until the person is infected in every part and fatally stricken? Who would get well from a disease due to living self-propagating contagions? Again, who, if the hypothesis were true, would escape fertilisation? A general fertilising diffusion of self-propagating matter in minute invisible form entering the body as the air may enter could hardly be expected to select a small minority of a population, and if it did so at the first, why should it do so when it had seized upon many centres in which it could increase? But the history of all the communicable diseases shows that each epidemic affects individuals individually at different periods in the course of the epidemic according, as a rule, to the exposure to the infected, and that the period of the disease is limited by a development and a course rendered in certain periods of time. I need hardly add in objecting to this germ hypothesis, because the fact is admitted on all

sides, that not only has no one ever seen a germ disease, but that no one has ever traced any order of germination in relation to any of the communicable diseases. When a really living self-propagating thing goes through its phases of life and action, like, for example, the yeast growth, we can trace it through its course, and during its action on organic substances, can study its effects, the changes it produces, and the products of such changes. In the epidemic diseases we have no such guidance, no trace of it. These phenomena, indeed, are opposed to the idea of self-action of foreign vital material within the affected forms of pestilent disease. He then turned to a review of what he called the 'glandular theory' of the origin of contagious diseases, and of advances he had made in support of that theory during the last ten years. In that time he had seen no reason to change his views on the subject of the glandular origin of the communicable diseases. On the contrary, every new observation had tended to confirm it, and to make the demonstration of the truth more definite. In continuance of observations he had noted that the number of the distinctly communicable diseases is closely related with the number of secretions. The poison of hydrophobia is from the salivary secretion; of diphtheria, from the mucous glands of the throat; of scarlet fever, he believed, from the lymphatic glandular secretion; of glanders, from the mucous secretion of the nasal surface; of typhoid, from the mucous glands of the intestinal surface; and so on. In some instances the blood itself is infected, and the corpuscular matter becomes the seat of the catalytic change. A second point which had occurred to him is that the matter or particle which sets up the poisonous action, instead of being living matter, is matter actually dead, and that its effect for evil depends, in fact, upon its being dead. He meant that dead particles of organic matter in contact with living is the cause of the physical change which transforms the new particles of secretion into poisonous particles as they are brought up to the infected surface to be influenced by the infection. On the ground that the poisons were always of glandular origin, he had been led to the conclusion that under certain influences affecting glandular action the poisons may be made to originate directly through nervous impression without the necessary intervention of an infecting particle. In many epidemics it is common to see a number of examples of the prevailing disease, the origin of which is traceable only to fear or anxiety. 'We call these,' the speaker said, 'nervous cases, and we try to define them as such, and as distinct from cases due to contagion of a direct kind. But the symptoms are the same as those which follow actual contagion, and in epidemics of cholera they take even a fatal character. My theory explains fully the reason of this. It indicates that an extreme nervous impression acts on the glandular nervous supply, paralyses the glandular function, and thereupon produces the same phenomena as are produced in other instances by the action of a specific poison. The theory in this manner accounts for the origin of an epidemic disease from an impression made on the nervous system without the direct contact of poisonous matter, as well as for the after propagation of the disease by distribution of poisonous particles when that is communicated from an infected to a healthy person. It accounts equally for the production of disease and of a poisonous glandular product under conditions of starvation and cold, by which the nervous tension is reduced. Again, it accounts for the production of disease and of a poisonous glandular secretion under special atmospherical conditions in which the activity of the atmospheric oxygen is reduced in sustaining power. . . . The study of the glandular theory of the communicable diseases has suggested to me another thought which observation of the diseases fully confirms—namely, that these diseases, like all which have their root in nervous derangement, present a distinct "heredity." The impression of disease made on a nervous centre is transmitted. There can be no doubt as to transmission of tendency to particular communicable diseases. Any physician in full practice can find any amount of evidence on the fact by simple natural inquiry. Typhoid fever is clearly a disease possessing hereditary transmissible quality. Diphtheria is the same, scarlet fever is the same, and small-pox, I should suspect, was once almost universally so characterised. These facts alone, one of them alone, is sufficient to stamp the origin of the communicable diseases as from the animal body itself. It is certainly one of the best of proofs of the truth of the theory of the glandular origin of the poisons. It will be seen at once by those who look with sufficient patience, that the mode of connection of the diseases in hereditary line is the same as that which connects hereditary qualities of every kind, physical type, mental type, all else that binds many individualities into one family. Lastly, the study of the glandular theory of the communicable diseases enables me to offer the most rational explanation of the phenomenon of non-recurrence of the diseases after they have once attacked a person susceptible to them. It is well understood that, as a rule, a person who has been affected by a communicable disease is not affected a second time. To this rule there are many exceptions, but, on the whole, it holds good. On my theory the reason of the phenomenon is simple enough. They who are susceptible are born with a nervous impression tending to the production of a glandular secretion, easily changed into poisonous secretion under the direct action of contact with poisonous matter, or even under the influence of a central nervous depression, whereby the glandular function is deranged. But when such a person has passed through the ordeal, the tendency, for a time at least, disappears, owing to the complete modification of glandular function that has been induced, to the free elimination that has been established, and probably to the change in the nervous matter itself that has resulted from organic modification. Hence the organism becomes susceptible for a time, and if the tendency be not intense that time may mean the whole of life. Indeed, as life advances, and nervous susceptibilities, derived directly from ancestry, lapse into individual self-sustained susceptibilities, these tendencies to disease subside as a general fact, and lose their activity, if not their existence.'

ON THE NECESSITY OF PLUMBERS AND BUILDERS POSSESSING A COMPETENT KNOWLEDGE OF THE LAWS OF HEALTH AS BEARING ON THEIR RESPECTIVE OCCUPATIONS. By J. A. RUSSELL, M.A., M.B., B.Sc. (Public Health).

The need of healthy dwellings is so patent that it is wonderful nothing has yet been done to instruct those who make and fit them up for us. Very wealthy people may employ a sanitary engineer who can apply to physicians and physicists for his facts and then apply them in practice. Notwithstanding some odd renderings of physiological data in one of the latest and best works by one of this profession, we may assume that it is not they who most stand in need of instruction. The architects who plan our houses have given abundant proof of the necessity of making some little acquaintance with the laws of health a part of their technical knowledge. We may very fairly judge of the information possessed by the mass of the profession, if we look into those little pocket books in universal use among them, such as Molesworth's 'Engineering Formulæ' and Hurst's 'Architectural Surveyor's Handbook.' I select these both because they are excellent books, and because they are to some extent compilations, every reader being invited to correct or send information. One sample from each on a vital point will suffice. In the 17th edition of Molesworth and in the 9th edition of Hurst I find it stated that each person requires three to four cubic feet of air per minute, being just one-thirteenth of the minimum allowed by physicians. Indeed, if experimental testimony against the architect be wanted it can always be had at the nearest crowded church or theatre. But if such be the case with the architect, what shall we say of the constructors of the enormous number of dwellings erected without his help. Here, indeed, we find too abundant proof that ignorance is cruel, for it has slain thousands. Much has been said of the cupidity which

runs up mushroom dwellings that defy all laws of health, but I think that few persons would have the courage to build in this way were they not encased in a triple shield of ignorance of the consequences. So long as these are unknown or merely dim and vague it is easy to quiet the conscience with excuses. And we must remember that no trades are exposed to such temptation as those of the builder and plumber. A good plumber must be a man of more than ordinary honesty of character. The temptation to scamp the workmanship and material can only be realised if we consider that he is safe from any criticism; for the work is hidden from view, the public for whom it is done understand nothing about it, and are so repelled by the nastiness of the subject that there is no danger of their inquiring or examining too closely, and as for the 'hands,' all they know is that they are working in the same way as their neighbours. It is in vain to pass Acts of Parliament, or frame regulations, while there is no intelligent public opinion in the trade to enforce them. An Act of Parliament has never yet been carried out by people who did not believe in its utility, and it is quite hopeless to suppose that an inspector, by a mere visit, can discover small though terribly important faults hidden away in corners.

The education of the workmen themselves is the true remedy. I am aware that it is supposed the English workman or soldier should obey and not think. But this old rule will no longer do. Intelligent work is required from the lowest grade in the army of labour. It is a most significant fact that officers of the Prussian army before Metz were required to give lectures to their privates, explaining the operations in which they were engaged. If workmen were aware of the loss of energy and illness entailed by the escape of sewage gas into dwellings, not to speak of the fearful results which may occur from specific disease, surely very few would be so heartless as to join lead pipes without solder, or put cement only on the top or exposed side of the joint in an internal drain, leaving the sides open. As it is, the greatest evil they can see from such a proceeding is the risk of a slight smell which they would think nothing of themselves, and consequently cannot sympathise with what they consider the over refinement that objects to it. Men who knew something of the effects of damp subsoil and walls, and the porous nature of brick and mortar, would, in general, take some trouble to have subsoil drainage and damp-proof courses really effective. Moreover, by educating the ordinary hands, not only should we raise the standard of individual work, and create a public opinion in the trade, but we should provide the best possible check upon the doings of those men and masters who dared to scamp. The danger of falling into the hands of the sanitary authorities would be too great when every evil deed was observed by skilled witnesses.

The causes of the existing ignorance are not far to seek. The majority of men do not search after innovations as they become older, and are content to practise what they learn in youth. Consequently, the practice of trades is far behind the books written by the leaders of thought. Our builders and plumbers are now simply practising what they were taught by sanitary engineers twenty years ago. Architects and builders have a literature, but it does not seem to have taught them how to protect the air of rooms from vitiation by the products of combustion of gas. Ventilation, too, by open windows, etc., has been preached by those who do not know that most persons would sooner be poisoned comfortably than live in cold air, however pure. Until recently plumbers had no text-books, and only obtained insight to the craft by a long probation. The more pretentious but less commendable of the two lately published is silent upon the vital points of the passage of gases through water, and the corrosive action of these same gases upon lead. Strange to say, Mr. Buchan, in his excellent little book, only mentions them incidentally, though he is Dr. Fergus's own plumber. The first-mentioned author, forgetful that solid matters float till more or less dissolved, puts great faith in deep dips for traps, and has invented a trap of extraordinary depth, but mercifully protects the public by putting a patent over it. Both authors contradict each other on several points. Another source of difficulty arises from the fact that the theoretical ideas embodied by practical men in their work are derived from laboratory experiments on the behaviour of fluids and gases in closed tubes. These are very misleading when applied to roughly fitting apparatus, or to pipes constructed of materials more or less porous. This source of error can only be overcome by careful experiments upon average house fittings. It is a disgrace to the trades that they have done nothing to advance knowledge in their own department, and left such an obvious fact as the corrosion of lead pipes by sewage air to be discovered by a physician. It appears to me that much might be done in every town to remedy the present state of matters by a short course of lectures in which the conditions to be fulfilled in building and fitting a healthy house should be set forth. The chief properties of liquids and gases should be explained as well as the more important physical and chemical properties of the materials used. It is, then, the business of the tradesmen and not of the lecturer to find practicable means for satisfying the requirements of the laws of health, though he may criticise the means already devised. Such instruction would certainly lead to invention and to the production of good text books by workmen provided in this way with the necessary preliminary information. The course should be brief, but fortunately there would be no need to explain the way in which physiologists had arrived at the data which have to be learned. The amount of air needed for each person, for lights and fires, the effects of a deficient supply and the chief data regarding warming, ventilation, prevention of damp, evils of undrained subsoil, etc., might be taught in a very short time. Whenever an easily understood explanation of practical rules of the trade can be given workmen will be glad of it, and it would help greatly to promote an observance of the rule. No builder who saw a candle extinguished by air blown through a brick as in Pettenkofer's experiment, and the effect of wetting it, will ever look on bricks and mortar in the same way again. A plumber who saw white lead made after the old Dutch method—where a sheet of lead is suspended above a little vinegar within a jar packed in stable manure—would begin to think that gases from organic matter might act upon lead, and for the future he would probably examine the upper surface of horizontal lead pipes for gas-leaks, as well as pass his hand along the lower surface in search of wet. If he were shown the passage of gas, though coming from a ventilated tube, through water, he might speak less loudly of the safety of traps, and even have his confidence shaken in the security of his work generally, and insist on having it placed so as to admit of easy inspection. A knowledge of the true amount of the expansion and contraction of metals must lead to better fitting joints, while care in the making and placing of cisterns would result from an acquaintance with the absorption of gases by water and the conditions under which it may be contaminated with lead. In short a class of worthy persons whose works are at present in many cases a danger to us would add safety to the convenience and decency resulting from their labours. In giving such lectures, two words incessantly occurring in the sanitary journals may be avoided, as for the most part they are merely signs of ignorance. They are 'proper' and 'suitable.' An amusing list of their use by writers could be given, but I prefer quoting a single sentence from a journal of this week, as it seems to show that another word is to be added to the two already indicative of platitude. 'All outbuildings should be located at a safe distance from the house.' Lectures such as I have indicated might best be delivered by the medical officer of health, or some local medical man, under the auspices of the Sanitary Institute, which might lend diagrams and models for illustration. Many advantages would accrue from their delivery by a local rather than by a peripatetic lecturer, and

chief of these I may mention the preservation of individuality of thought in an age of pernicious centralisation. The Royal Scottish Society of Arts has already arranged for the delivery of a course of this kind to workmen in Edinburgh.

ON THE PRESENT POSSIBILITIES OF SANITARY LEGISLATION. By Mr. R. BRUDENELL-CARTER.

Mr. R. Brudenell-Carter said that he had selected for his theme 'The Present Possibilities of Sanitary Legislation,' or, in other words, the inquiry, 'What amendments of the law, in the interests of public health, are practicable in the existing state of enlightenment and of opinion?' It was universally admitted that no law could be useful which did not command the willing assent of the majority of those who lived under its provisions; and he thought it was also admitted that legislation, especially when it had regard to questions upon which knowledge was increasing and was becoming every year more widely diffused, might with propriety be a little in advance of prevailing practice, so that it might, to some extent, exert an educational influence. A legislature had to ask in such a case, first, how far it must go in order to fulfil a plain duty; and, next, how much further it might venture without fear of defeating its own endeavours by an excess of zeal. It would, the speaker said, be easier, perhaps, to reply to both these questions by beginning at the beginning, and briefly considering why it was that laws in the interests of public health were required at all, and what purposes they were intended to fulfil. If, he said, we enclose a warm-blooded living animal—a human being, or any other—in a case impervious to air, the inmate would soon perish of suffocation, because he had rendered the air inclosed with him irrespirable, or incapable of sustaining life. If the case were so arranged as to allow a partial renewal of the contained air, the inmate would none the less perish after a time, poisoned by the excretions from his own body. The rate of poisoning, and to some extent also the symptoms, would depend upon the extent to which the air was renewed; but the process would always be essentially the same. If the case contained two or more animals, they would exert a reciprocally injurious influence upon each other, and each would hasten the death of his fellow prisoners. In order to render it possible for them to live in the supposed confinement, air must be admitted freely, and the case must be cleansed at short and regular intervals. In these few facts we had at once the basis of all sanitary science and the explanation of the need for sanitary legislation. The state of the members of a crowded community bears a very close analogy to that of several animals imprisoned in a cage with insufficient air-supply and with inadequate provision for the removal of nuisances. The latter element of the supposed condition was to be seen under two chief forms—one in which the nuisances remained about the dwellings of those who had produced them; another in which the nuisances were carried a little way from the dwellings to some other place where the noxious influences were exerted upon persons innocent of having produced them. In either case the noxious influence displayed itself in the production of symptoms of poisoning—symptoms differentiated by various known, and probably by some unknown conditions, and which were called, or were said to constitute, different contagious or self-propagating diseases. Among the known causes of variation were the different proportions in which the symptoms might be due to deficient air-supply, or to the influence of filth, together with the different degrees of individual resisting power due to inherited strength or weakness, good or bad living, or the like. Among the conditions, the operations of which were unknown, although their activity might be surmised, were various atmospheric influences and various methods of the propagation or diffusion of the poison. In former times the experiment of compulsory overcrowding and of the imperfect removal of nuisances was systematically tried in English prisons, and the results obtained were of a twofold character. In the first place, the prisoners so treated became the subjects of pestilential disease, described by successive contemporary chroniclers under different names, as 'Black Death,' and so forth, but which was probably always what we now know as typhus fever; and, in the next place, not only did the prisoners suffer; they revenged themselves in a terrible manner. The disease engendered by the condition under which they were placed was not restrained within limits imposed by those conditions, but diffused its poison from the persons and from the garments of those who were first affected, and was even carried long distances by the intermediation of people and of things. Prisoners who themselves escaped fever, but who were brought from the dens in which it prevailed, brought with them, in their garments or in the emanations from their bodies, the means of conveying it to others by the process which we now call 'contagion' or 'infection.' Judges, counsel, jurymen, spectators, all fell victims, and at the famous Black Assize at Oxford, held on the 4th, 5th, and 6th days of July, 1577, it is recorded by Holinshed that when one 'Rowland Jenkes was being arraigned for his seditious toong,' there arose among the people present 'such a dampe that almost all were smouldered.' The jurors died presently. Shortly after died Sir Robert Bell, Lord Chief Baron, with twelve others, whose names were given. There died in the town of Oxford 300 persons, and there sickened there, but died in other places, more than 200, from July 6 to August 12. The plague, which at one time almost depopulated London, was indebted for its power of mischief, if not for its existence, to the filthy houses of our ancestors, in which the removal of nuisances was systematically neglected, and where the floors were strewn with fresh rushes, placed in successive layers over refuse of all kinds suffered to rot underneath. The glorious history of the British navy is shamefully chequered by the records of the pestilences which have from time to time originated or were cultivated on board our ships, and it was only recently, comparatively speaking, that the health of the inmates of public buildings and institutions had in any case been cared for. To that care, it had often been said of late, the War Office still remained a striking and instructive exception. In times within living memory the apparent origination of sickness by insanitary conditions had become a less familiar phenomenon than its propagation under circumstances favourable to its increase. We had now constantly among us some seven principal types of communicable disease—small-pox, measles, scarlet fever, diphtheria, whooping cough, fever, and diarrhœa—destroying in England and Wales alone in the most favourable years about 60,000 lives, and some years 100,000 lives. It was known that some of them, and it was surmised, with much reason, that all were produced or propagated solely by means of filth; that they were the results of imperfect nuisance removal; or, in other words, of that self-poisoning or reciprocal poisoning process which would occur in the instance of animals enclosed together in a case, and which occurred in mediæval gaols. These results, however, were modified by various circumstances which had tended to mitigate the intensity of the poison; and therefore, regarded as the result of experiment, they seemed less conclusive than such histories as that of the Black Hole of Calcutta or the Black Assize at Oxford. Moreover, the diseases in question, apart altogether from their first origin, had now acquired, or at least possessed, a power and method of self-propagation which had caused them to be called 'zymotic.' No one could say that the process of fermentation and the process of contagion-increase were identical, and it was even possible that there might be important differences between them; but there was certainly enough resemblance to justify the use of the word 'zymotic,' as the reminder of the way in which a morbid poison was multiplied in the human body; but we must not become enslaved by the word, or suffer it to restrain the freedom of our thoughts. He proceeded to explain that the phenomena resembling zymosis consisted of the small portion of the poison generated by a disease, which, when introduced

into a susceptible human body, gave rise to symptoms of illness which issued in the formation of a great deal more material similar to itself, and capable of communicating the same disease to others. Every 'zymotic,' or, to use the better phrase of Dr. Budd, every 'self-propagating malady,' attacked its own especial part of the organism, and discharged its poison by its own special channel. For this reason, among others, it had been assumed that the poison was to be regarded as consisting of 'seeds' or 'germs,' necessarily reproducing their own kind. There had been much talk about these 'germs,' and about 'germicide remedies,' as if the existence of germs were a fact, instead of being only a convenient assumption. It was perfectly conceivable that the poison of these diseases might not consist of germs at all, but might be dead matter acting by means of chemical affinities, and an inconvenience incidental to the use of the word 'germ' was that it tended to impose a hypothesis as a truth. This want of certainty did not matter so far as scientific men were concerned, because they were not likely to be misled by what South felicitously called 'the terrible imposture and force of words;' but it mattered greatly to some of those to whom the Legislature had committed the care of the public health in districts and localities, because they were led to fancy that they knew something when they did not, and to think themselves less ignorant than they really were, and thus to undertake responsibilities and to pursue conduct from which wiser or better instructed persons would shrink with something like dismay. He proceeded to deal with the inferences held by some that these diseases, as we now know them, are the results of distinct varieties of poison, that they have ceased to originate spontaneously, and that they always depend upon infection, as well as with the opinions held by others—persons, too, whose opinions are entitled to weight—that the evidence is against all these suppositions; that different types of disease may originate from a common cause, and that the epidemic maladies with which we are familiar may arise even under certain combinations of circumstances. Dr. Budd and his followers held very strongly that every case, say of typhoid, whatever might have been the first origin of the disease, must now be the offspring of a pre-existing case, as strictly as a child must be the offspring of its parents; but, on the other hand, there had been many instances of typhoid and of analogous diseases in which no source of contagion could be discovered, citing the fact of a single fatal case of cholera in the prison at Agra to a prisoner who had been in the gaol for two years, 2,000 other prisoners being in the gaol, and no second case of the disease occurring. Taking the reverse of the picture, many instances were found in which the origin of what at first seemed to be 'spontaneous typhoid' had been traced to its parent case as soon as the investigation had been undertaken by a person of sufficient skill and knowledge, and an example of this was pointed out in Dr. Buchanan's discovery of the channel through which typhoid poison found entrance to Caius College. The question raised in these points was not a merely speculative one, but was of the highest practical importance to all who sought the preservation of the public health. It was manifest that if every case of disease must now be the result of a pre-existing case, the entire extinction of such a disease was at least theoretically practicable. It would only be necessary to destroy all the newly-formed poison for a certain number of weeks or months, and the malady would disappear, and it would not be insuperably difficult to guard against its re-introduction from foreign countries. If it could be proved to be true that zymotic diseases constantly originated anew—that they arose out of certain combinations of favourable conditions, then the work of sanitary reformers, although by no means hopeless, was almost inconceivably more difficult and more arduous. Which of the views might be true was at present wholly uncertain, but, added the speaker, we must not suffer ourselves to imagine that certainty can be attained by the simple process of talking about 'germs.' It can only be attained by the patient investigations of competent observers—of men who are possessed of all the knowledge necessary to the correct appreciation of the nature of the facts which come before them, and who sought for truth without reference to preconceived opinions. It must be admitted that the question was of great practical importance. We did not want, he said, to follow some philosophers in their disputes over the necessarily insoluble problem of spontaneous generation, but we wanted to know whether, as a matter of practical fact, a case of typhoid fever necessarily presumes a pre-existing case in a channel of contagion or only a pre-existing combination of physical conditions. The great difficulty of answering this question arose from the extraordinary complexity of the conditions favourable to the diffusion of disease which we have allowed to spring up around us. It could not be said that a case of typhoid had arisen spontaneously unless every possible channel through which the poison might have been introduced from without had been excluded. Such channels were at present innumerable, and one thing which ought to be sought from the law was their gradual closure. As soon as it was certain that the poison of typhoid commonly came by some particular inlet, that inlet should be made secure against it in the future; and so in time, by the mere process of stopping inlets or guarding them, we should arrive, by the method of exclusion, at certainties at present unattainable. He mentioned how scarlet fever was communicated to his own family by a dog who had come straight into his garden from children who were, it was afterwards found, down with the disease. Thus, he said, disease, may be conveyed in some such unsuspected manner as this—by a stray dog, by a beggar, by a tradesman's messenger, in a public conveyance, in a place of amusement, or by casual contact in the street. The postman may have put it into the letter-box, or it may have been delivered with clean linen by the laundress. As long as all these possibilities exist we can be sure of nothing, not even that the disease has actually found admission through the particular channel we suspect. One of the things he thought we might ask from the law, even in the present state of knowledge, was adequate assistance in guarding some of the channels, such as soil-pipes and water-pipes, through which the diseases most familiar to us are now daily distributed. It could not be said that this would be asking the legislature to interpose in a small matter, or to take upon itself duties unworthy of an Imperial assemblage. Lord Macaulay said that 'the business of a Government is to protect the lives and property of the governed,' and both the lives and the property of the English people suffered terribly from the state of things now permitted to exist among us. He showed that the 'so-called zymotic' diseases had caused in twenty-five years the loss of 2,500,000 lives in England and Wales, out of a total mortality of 11,000,000. By adding to the 2,500,000 the number of 500,000 for another five years, we arrive at a zymotic mortality of 3,000,000, or nearly equal to the population of London in a single generation. He multiplied the average annual mortality by six, and obtained what is a very low estimate of the average annual sickness, and, taking the average duration of sickness from estimates furnished by Dr. Buchanan, he showed that the total annual cost and loss occasioned by illness alone from zymotic diseases in this country, if it fell upon the wage-earning class alone, would amount annually to more than 2,500,000*l*. But the greater cost of the incidence of these diseases upon the better class could not be estimated from any *data* known to him; the illness of the Prince of Wales disturbed the whole current of English life, and the value of such a life as that of the Prince Consort, or the value of some of the lives which were destroyed by the recent milk typhoid in Marylebone, transcend powers of expression. The money cost fell partly upon the relatives of the sick, partly upon the members of sick clubs and benefit societies, upon the savings of the sufferers, and partly, and very largely,

upon the poor-rates. The 100,000 premature interments a year must cost at least 2*l.* each, and their total must raise the cost of the diseases to us to more than 2,750,000*l.*, without reckoning the loss to widows and children of husbands and fathers. Then there was the loss to the community through imperfect recoveries from these diseases; and to this fact he spoke from his experience at two of the large hospitals of London, where he saw children suffering from eye disease, and the origin of the disease was constantly given as—'Ever since he had the measles.' In the first census return for 1871 it was shown that more than one-tenth of the existing blindness in this country was due to zymotic disease. He spoke of the other evils which followed the diseases, and added, 'If such evils were to fall, for the first time, upon a community paying heed to sanitary regulations, scarcely any effort would be thought too great for their removal. It was only the deadening influence of habit which enables so many among ourselves to regard them with comparative indifference.' It would be too much to say that all zymotic disease could be prevented by proper legislation and adequate care; but past experience was distinctly in favour of the proposition. It was known that improvement in the public health of England, coincidently with improved nuisance removal, had been very remarkable, and this not only by a comparison of the 'Plague period' with the present time, but even in our own time. He referred to Dr. Buchanan's facts in Mr. Simon's reports as to the changes which had been produced in certain towns by the works for promoting public health, and, quoting the report on Macclesfield, showed that whereas the death-rate used to be 33 per 1,000 it had fallen to 26, and that in four streets where inhabitants received over 158*l.* 4*s.* 9*d.* in relief from the poor-rate before the improvement, they afterwards received only 25*l.* 5*s.* 6*d.* All knew the old scholastic definition of the relation of a cause to its effect,—*Præsens facit, mutata mutat, sublata tollit*—and the relations of insanitary conditions to diseases afforded a manifest fulfilment of the first two clauses of this definition. When our forefathers lived in filth unspeakable, the country was ravaged by pestilences of greater severity than could now be realised—*præsens facit*. As we had become somewhat more cleanly our epidemics had become of changed type and of less severity —*mutata mutat*. If we could become cleanly altogether he had little doubt we should realise the final clause—*sublata tollit*, and should banish epidemics from the land. It was by these considerations that he was led to what seemed to him to be the proper answer to the question, 'What can the Legislature do for us, consistently with the present state of public opinion and intelligence, which may lead, in due time, to a more complete recognition of public health, and the necessity of taking, in the public interest, such measures as may tend to its preservation?' It was obvious that the nature of the answer must depend upon the nature of the impediments which at present stand in the way of complete and effective legislation. These impediments depended chiefly, it seemed to him, upon four causes. First, to the degree in which legislation was made subservient to the interests of 'party' without sufficient reference to the needs or the welfare of the State. Secondly, upon the degree in which local government is impeded by centralisation. Thirdly, upon the real or apparent inequalities in the incidence of the local taxation from which the cost of sanitary reforms must be defrayed. And, fourthly, upon the existence of an apathy which was the result of an almost inconceivable ignorance, largely tempered by superstition. These four causes were so intermingled in their operation that, although they might be separately stated, they could hardly be separately considered, and it was unnecessary to point out that the last of them, the apathy engendered by ignorance and superstition, was practically that which permitted the existence of the others. If the inhabitants of this country were once to realise that the 10,000 annually-recurring deaths, say from typhoid fever, were not due to any supernatural cause, but were simply so many murders, resembling in everything but the elements of individual criminality, the starving to death of children in 'baby farms,' or the wanton destruction of life by any other description of neglect, the indignation which would be aroused would make short work of imaginary obstacles to reform. As long as the ignorance and the superstition remained, all that could be done was to regard insanitary abuses as giants to be circumvented, not as dwarfs to be overthrown, and every opportunity should be taken for endeavouring to spread abroad knowledge. In respect of this endeavour, and without any infringement of the liberty of the free-born Briton to diffuse present contagion where he pleased, the law might be so modified as to render assistance of the greatest possible value. He proceeded to urge that the first step to this end was to provide for the registration of every case of self-propagating disease which came under the notice of any public practitioner in his official capacity. He confessed that he should like to see more than this—that it should be a matter of statutory obligation upon every medical practitioner to report to the sanitary authority of the district every case of self-propagating disease; and such cases should no more be hidden than the breaking out of fire should be hidden from a locality. If such cases were reported, a Government Department could at once send down an inspector to investigate how the disease had been introduced—such 'inspector,' he begged to say explicitly, to be a physician thoroughly trained in the difficult art of sanitary inquiry, and he did not mean 'a barrister, or an engineer, or a surveyor, or a person who does not know scarlet fever from measles.' Such 'skilled inspector' would not be sent down to interfere with the local authorities, but to declare the truth, to trace out the facts, communicating them to the local authorities, and should publish them in the local prints, bringing into prominence the cost of sickness. The report could show that in regard to typhoid fever, for instance, some passing tramps had poisoned Farmer Jones's cesspool, that this had leaked into the brook, that the water of the brook was drunk by the villagers, that there had been so many cases, so many deaths of adults, so many of children, so much expense for temporary relief, so much for the maintenance of widows and orphans left permanently chargeable, the total cost of which capitalised would be estimated at 1,500*l.*, all of which would have been saved by stopping the leak of the cesspool at a cost of 5*l.* The statement thus submitted would show the cost of a piece of ignorant parsimony or an instance of presumptuous rashness, and this, he said, would be better than talking to the average 'vestry,' 'board,' or 'guardian' mind about sewer gas in towns and polluted water in all places as abstract agencies. Such authority would realise the facts about Farmer Jones's cesspool, and all talk of the misery caused must be put aside, the expense of the neglect only being dwelt upon. This action would furnish seeds of thought which would germinate surely if slowly, and would lead to a readiness to submit to legislative enactments manifestly necessary for the ventilation of sewers and the protection of water from pollution. He proceeded to discuss the present system of Governmental inquiries into the circumstances of disease, and said they were conducted in circumstances fatal to their usefulness, for the disease was only heard of when it wrote it-elf down in the quarterly returns or had reached alarming dimensions, and in either case the difficulties of investigation had enormously increased. The first cause, no bigger than a grain of mustard seed, was by that time obscured and lost sight of among subsequent occurrences; and the public interest in the whole question had, perhaps, begun to flag with the subsidence of fear and with the diminution of sickness. Such inquiries, in order that they might be useful in the greatest possible degree, must be instituted concurrently with the events to which they related, and must be instituted with regard to all recurring illnesses of the self-propagating character. He asked of the Legislature, as the most urgent present requirement, that infectious

diseases occurring among public patients should be registered, that the attention of the central medical officer of health should be directed to the register, and that the occurrence of self-propagating disease should be made the subject of regular official investigation and report. He urged, as another point, that politicians should turn their attention without delay to the question of the incidence of rating—not to trifle with it, not to allay discontent by a tiny bribe from the Consolidated Fund, but to revise and rearrange it thoroughly. The next direction in which legislation would be immediately practicable would be in a great extension of the powers of local self-government. Our present so-called 'local authorities,' he said, 'are so tied and bound in the chain of centralisation that we can only obtain somewhat inferior persons to hold offices which entail considerable trouble and which confer no real authority.' He dwelt upon the evils of this system to the community at large, and asked if it would not be a better system if the great towns were at liberty to act as pioneers in the way of social improvement, and to bring the opinions of a majority of the inhabitants to the test of practice. At present Parliament was unable to accomplish the work which it commenced, and this was mainly because so much of every session was consumed over matters which might be perfectly well settled by local representative bodies. The result of making local government a reality would be that communities which elected incapable men would smart for their mistake, and would learn not to repeat it; and communities which elected capable men would be able to bring measures of improvement, sanitary or social, to practical tests which would guide other communities in regard to them. The blunders of any locality would furnish warnings to be avoided, and successes would furnish examples to be followed. Towns known as 'health resorts' would be eager to take the lead in diminishing local mortality, and if they succeeded they would also diminish local charges. Their success in this direction would not fail to obtain for them before long the sincere homage of imitation. Towards the conclusion of the address the speaker said he had intended to say a few words about that 'unclean idol,' 'Party politics,' which had been so great an obstacle in the way of sanitary reform, and before whose shrine, therefore, the lives of the people of England had been offered up; but he desisted from expressing his warm feelings upon this part of the question, and his concluding words were: I will be content to utter the wish that, if such a transformation is possible, some professional politician of the day may undergo development into a statesman, and may thus become able to perceive the opportunity for the highest statesmanship, which would invite him to enter upon a comparatively untrodden career. I am certain that any man of adequate culture and adequate capacity who would devote himself to this great subject with a determination to understand it, and with a determination to rouse his fellow-countrymen from their present indifference with regard to it, might, by the patient and well-directed labour even of only a few years, write his name upon the pages of history as that of the greatest benefactor of his kind. In the meanwhile, we are here like passing travellers who throw our single pebbles upon the cairn, which at last, by innumerable contributions, will attain monumental magnitude. Our present business may seem trivial. It may produce no immediate or perceptible results. None the less, however, will it be seed which cannot fail hereafter to yield a harvest; and in proportion as our work is earnest and truth-seeking, so far will it hasten the advent of the time to which we must look forward with hope and confidence—when Englishmen and Englishwomen will no longer every year be poisoned by thousands by accumulations of filth, against which individuals are powerless, and against which we, as a nation, are too indolent or too ignorant to remove.

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

SANITARY INSPECTORS.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Having had my attention directed to the letter with the above heading in your impression of September 28, page 210, I should not feel content to allow the opportunity to pass without making a few remarks. Your correspondent (Medical Officer of Health), is apparently somewhat aggrieved at the title of Sanitary Inspector being applied to officials mentioned in the Public Health Acts as inspectors of nuisances. We might with Shakespeare say, 'What's in a name?' at any rate I think, Mr. Editor, you will agree with me that 'Sanitary Inspector' is the more euphonious name of the two, although the difference is slight. Your correspondent is apprehensive of much mischief being worked by this new title. I for one would certainly refrain from again using the name were I in the least afraid of any mischief being brought about between our respected medical officer of health and myself. On the other hand, some twelve months ago our medical officer of health recommended me to use the words 'sanitary inspector,' assigning as a reason, that it sounded so much better than the previous one. I adopted his suggestion, and have found no inconvenience arise therefrom. I think that the better educated portion of the community sufficiently understand the position of a medical officer of health to know that he is, by virtue of his office, the leading and principal official in a sanitary organisation.

In the second portion of your correspondent's letter, he directs our attention to a self-constituted body assuming the authority to hold examinations for inspectors. I presume he refers to the 'Sanitary Institute of Great Britain,' a new association, of which I think every inspector in the kingdom will feel extremely proud. My opinions in this matter are shared by several inspectors with whom I have conversed on the subject, and I feel confident that any efforts in this direction which tend to improve the theoretical knowledge and elevate the status of inspectors, will be gladly received by those who have the real interests of the health of the community at heart. I do think that on the same principle that a medical gentleman is required to pass certain examinations, exactly ought an inspector of nuisances, in proportion to the lesser importance of his office, to pass certain examinations previous to his undertaking the duties.

In conclusion, I beg to assure your correspondent that these few remarks are written with the best intentions and in the interests of the object which we all have at heart, namely, to alleviate, so far as lies in our power, the sufferings of humanity. I trust that no offence will be taken, as none is intended. JOSEPH ROBINSON.

Carlisle.

INSPECTORS OF NUISANCES.

(*To the Editor of the* SANITARY RECORD.)

SIR,—I never heard of a sanitary inspector; what is he? The Public Health Act of 1875 has no reference to such an official, therefore he simply does not exist. I agree with the letter of 'Medical Officer of Health' which appeared in your issue of the 28th ult. I, too, am an officer of health, and I will take good care that none of my inspectors of nuisances shall even attempt to call themselves sanitary inspectors. Of course one cannot help how or in what manner the public may choose to address them. If my inspectors of nuisances are addressed as esquires, even by the probable mistake of a Local Government Board clerk, it will only elicit a smile from me.

I am very sorry to see that the Sanitary Institute of Great Britain intends—doubtless with the best, but in my opinion most decidedly mistaken, motives—to start exami-

nations with the object of certificating inspectors of nuisances. This busy action on their part will be the means, should they persist in their intention, of giving a great deal of trouble in the future to medical officers of health. Inspectors of nuisances are necessarily taken from a class who may be said to possess much ignorant-intelligence (to coin a word for the occasion), added to which there is a deal of self-asserted importance.

Had I any doubts on the subject, the letter of Inspector of Nuisances Davies in to-day's RECORD would have quite convinced me that men such as he is ought to be kept in their proper place. When I was first appointed I had just such a man to deal with; it took some time, a little trouble, and a good deal of firmness to put him in his right place. All I can say is that he is at the present time in his proper place, and we work very well together, although I generally have to keep my weather eye open.

The sanitary authority whose officer I am does me the honour and pays me the respect of consulting me whenever a fresh appointment has to be made. I think I have some little amount of influence in the matter, and I can honestly and conscientiously say that on public grounds alone I should consider an applicant or candidate for the office of inspector of nuisances to be singularly disqualified who was in possession of a certificate from the Sanitary Institute, or any body of a like nature. If the other medical officers of health think as I do, I fancy there will not be many candidates for the intended examinations. The first quality for an inspector of nuisances is strictly to obey orders and be amenable to thorough discipline; therefore the best material for inspectors of nuisances are men taken from the police force, and if the trade of a butcher, builder, bricklayer, or plumber can be superadded, why all the better.

One of the greatest evils I know of is the making a number of small diploma men. Our own profession is a good illustration of the evil results of small diploma and small degree men; these are the people who are always the most self-sufficient and bumptious.

The intended examination is a fair illustration of extreme and busy action. Why not have examinations for cooks and housemaids? They are very much more required.

Trusting to your usual sense of fairness to insert this letter, I am, Sir, yours, etc.,

October 5, 1877. M. O. H.

MEDICAL INSPECTORS.

(*To the Editor of the* SANITARY RECORD.)

SIR,—I think Mr. Davies misunderstands the cause of complaint by officers of health that inspectors of nuisances have often assumed the title of inspectors, and are thereby supposed to be equal or even superior to those who are, or ought to be, their masters. No man of sense cares whether he is called Mr. or Esq., but no one likes the office he holds to be under-estimated, as it is apt to be, if others, holding an inferior office, assume a title implying that it is superior. I submit, however, that the easiest way for officers of health to prevent this is by calling themselves medical officers of health, thus indicating the professional qualifications.

H. H. P.

THE WATER-SUPPLY OF SEASIDE WATERING-PLACES.

(*To the Editor of the* SANITARY RECORD.)

SIR,—I have read with great interest Mr. Wigner's articles on the above subject, and with your permission should like to obtain from their skilful author a little further information of this vexed subject—water analysis.

The form in which Mr. Wigner tabulates his results is an improvement on Professor Wanklyn's, as it expresses everything in 'grains per gallon,' which is, to ordinary readers, much more intelligible than 'parts per million.'

Will Mr. Wigner kindly say what value or significance he attaches to 'loss on ignition after deducting combined carbonic acid,' and how he estimates this combined carbonic acid?

Mr. Wigner also improves on Professor Wanklyn's form by calculating the chlorine as chloride of sodium, a method which, if not always chemically correct, is more easily understood by the people.

I should also like to know whether Mr. Wigner uses Professor Wanklyn's method of Nesslerising in estimating 'nitrogen as ammonia,' and nitrogen as 'albuminoid ammonia.' Also what value he attaches to the presence or absence of nitrates and nitrites?

In reading these reports one cannot help being much struck with the fact that several waters comparatively ammonia free, are yet heavily laden with nitrates or nitrites.

I think Mr. Wigner attaches too much importance to the presence of salts in several of his samples. It is true the proportions are often heavy, but salt is so harmless and necessary an article of daily consumption that it matters little whether we take it in our water or out of the cruet. Of course I am referring to such waters as the Harwich and Dovercourt which are practically ammonia free, and not to chlorine of sewage origin.

At the risk of tiring Mr. Wigner I will further trespass on his good nature by asking him to favour me with his method of estimating the oxygen absorbed by organic matter.

For my own part, for the large majority of potable waters there is no test so readily applicable and so generally trustworthy as the much maligned permanganate test. One final word—What quantities of water does Mr. Wigner operate upon for ammonia and albuminoid ammonia?

St. Neots, October 9, 1877. WM. JACKSON,
Surveyor to the St. Neots Local Board.

Sanitary Inventions.

EXHIBITION OF SANITARY APPLIANCES AT LEAMINGTON.

THE Exhibition of Sanitary Appliances at Leamington promoted by the Sanitary Institute of Great Britain, has opened with a flourish of trumpets, and we congratulate the Institute, the Exhibitors, and the Leamingtonians, upon its success. On Wednesday, the 3rd inst., a public luncheon was partaken of at the Regent Hotel, and we wish we could here say a word in favour of the sanitary arrangements of that establishment, but we cannot. After luncheon a procession was formed, headed by the Mayor of Leamington and the President of the Institute, and preceded by the band of the Warwickshire Militia. Upon arriving at the Drill Hall, where the exhibition is being held, the Mayor after having made a few remarks upon the advantages likely to ensue from the Congress, declared the Exhibition open. Mr. Lawson Tait was to have given an account of the work of the interception sub-committee of the Birmingham Corporation, but as he did not arrive in time, Lieutenant-Colonel Jones read a paper on Sewage, Sewerage and Town Refuse. We suppose this was the best that could be done upon the emergency, but the subject did not appear attractive to the mixed audience present, who moved about and freely discussed the exhibits. A committee of judges has been appointed to decide upon the merits of the exhibits, and we understand one medal only is to be awarded in each section; these medals, awarded by a committee amongst whom are some of the highest authorities on sanitary subjects, will doubtless prove of great value to the exhibits, far more so than a certificate of merit, the plan adopted at the recent exhibition at Manchester.

Among the numerous interesting articles in this exhibition were designs for two hospitals. The first was a large wooden model of an hospital ward, showing a novel system of ventilation, designed by Mr. Francis Waller, of

the Grove, Southwark. The specialty of Mr. Waller's system consists in the placing of a ventilator capable of supplying either hot or cold air in whatever separate or combined proportion may be desired between each two beds. Each patient has thus his own especial supply of air, the quantity and temperature of which, instead of being, as it necessarily must be under the ordinary system, regulated entirely with a view to the general requirements of the ward, is governed solely by his own individual requirements. In theory the plan would appear to be excellent, but there may be some question how far it would be found efficient in practice. The position of the ventilators, however, would certainly appear advantageous in one respect, viz., in providing a current, or, as it were, a screen of constantly moving air between each pair of beds, thus cutting off all the exhalations of any one bed from the occupant of the bed adjoining. The arrangement, too, by which any proportion of hot or of cold air can be supplied by the simple turning of an index handle is both ingenious and useful. The other hospital is that known as the Burdett Cottage Hospital, and designed by Mr. Ernest Turner, F.R.I.B.A., of 44, Bedford Row. Mr. Turner's design is of a modest but picturesque description, costing for twelve beds about 2,500*l.* to 3,000*l.* according to locality, with an additional 700*l.* for every ten beds beyond that number. The hospital consists of a central building or 'pavilion,' two stories in height, with a basement for stores, cellars, larder, etc., and two one-storied wings, connected with the main building by corridors of some 30 ft. long, capable of being converted in the summer time, by removal of the windows, into mere covered ways, thus completely isolating the three buildings from each other. The main *corps de logis* contains on the ground floor the surgery and matron's room, one on either side on entering. Behind the former is the committee-room, used also as a mess-room for the staff; and behind the latter a large day-room. At the end of the hall is the operating-room, into one side of which opens the accident ward; beyond which again is a short corridor with a window on either side, the lavatory, etc., belonging to it. On the opposite side of the operating-room, but opening out of the corridor, is a bath-room, kitchen, scullery, etc. This latter portion of the building forms a double projection at the back of the main block, and on the upper floor of the latter are the rooms for the staff. The two wings consist each of a single ward, one for males, the other for females, at the back of each of which, and separated from it by a similar short lobby to that already noticed in the surgical ward, are the lavatories, etc., belonging to it. Whether these latter might not with advantage open from the corridor, or at least have a second entrance into it, is perhaps a question. It may also be worth consideration whether, if a portion only of the building is to be cellared, the wards would not be more benefited by it than the central building, the dwelling rooms of which are chiefly on the upper floor.

From hospitals we pass naturally to improvements in ventilation. The greater number of contrivances to this end exhibited here are, as usual, on the rotatory principle, the best of these being probably the patent exhaust cowls of Messrs. Scott, and the Archimedean screw ventilators of Mr. James Haworth. The former of these are constructed on the principle of Giffard's injector, and are made in various forms, some of them of a highly fanciful character, the mouth being kept to the wind by means of long wings placed on either side. Mr. Haworth's cowl, on the other hand, revolves constantly from whatever direction the wind falls upon it, carrying on its spindle a long fan-screw which sucks up the foul air from beneath and ejects it through the revolving top. The objection to both of these consists, of course, in their liability to wear and to become jammed with rust, etc. Messrs. Scott, indeed, claim to have discovered a metal of which the bearings of their spindles are made, and which only polishes with the action rust. And if this be so the difficulty of the jamming would seem to be at all events in a fair way to be surmounted. Still, the difficulty of wear would remain, and would even, as would seem likely, be increased. From both these objections Boyle's air-pump ventilators are free, as they are fixtures, and consequently exposed neither to friction nor to rust. A tube about 2 ft. in length and 18 in. in diameter has a conical tube inserted at one end with a diaphragm in the centre. The tube being placed in a horizontal position on the top of a vertical shaft, the slightest current of air passing through the conical tube is split up by the diaphragm, causing it to impinge all round the inside of the external tube, so that in passing out it acts like the piston of the air-pump in extruding the foul air through the vertical shaft from the apartment with which the latter is connected. There is an additional advantage in this form of ventilator over those of the revolving type in the absence of the horrible rattling and scrooping from which the latter are rarely if ever free.

Various forms of vertical tubes for the admission of air into rooms are to be seen on the stands of Messrs. Shillito and Shorland, of Manchester, and the Sanitary Engineering and Ventilating Company, of London. The special feature of those of the latter company is the introduction of a tray of water at the bottom of the tube, upon which, by means of deflecting plates, the grosser impurities in the air are thrown, and being retained by the water, prevented from entering the apartment. We have seen these water-trays successfully applied. Two of the simplest, but by no means the least valuable, of appliances in this section are the patent ventilating tubes exhibited by Mr. James Slater, 251, High Holborn. The object effected by these tubes is the carrying off of the products of combustion from gas jets, thus preserving the purity of the atmosphere, and preventing the discoloration of walls and ceilings; they assume two forms, one being particularly adapted for hospitals and private houses, and the other for warehouses, theatres, workrooms, etc. We specially commend this exhibit as one of general utility, easily applicable at a nominal cost.

Next to pure air in importance comes no doubt pure water, and, as might be expected, the Leamington Exhibition has a goodly show of filters and filtering apparatus of various descriptions. Amongst these may be noticed Dr. Bond's syphon filter, which consists of a hollow cylindrical metallic vessel, which, when placed in water, floats almost entirely immersed beneath the surface. This cylinder is divided into two compartments, the upper of which holds air and serves to give buoyancy to the vessel, while the lower one is packed with finely granulated animal charcoal. In an aperture at the bottom is placed a piece of compressed sponge, while to the top is attached one end of an india-rubber pipe, the other end of which terminates in a piece of glass tube. The water enters through the bottom of the vessel, and after undergoing a certain rough clearing in passing through the sponge, works its way up through the charcoal until it reaches the bottom of the tube by which it passes off. The bottom of the charcoal reservoir is formed of a removable perforated iron plate, by means of which the filtering material can be taken out either for cleansing or renewal. Dr. Bond exhibits also a 'floating reed filter,' which is simply a modification of the above, adapted to somewhat different circumstances. Another preparation brought forward for filtering purposes is that called sanitary carbon, and consists of the refuse of Kimmeridge shale after its destructive distillation. For many years this residuum was considered as absolutely valueless, and it is only quite recently that it has been found to possess all the properties of animal charcoal, the cost of which places it practically beyond our reach for filtering purposes. Sanitary carbon has been experimented upon with Judson's dyes, refuse water from dye works, Cornish iron, tin and clay mines, and raw London sewage obtained from the South Metropolitan main sewer at Wandsworth. All these filtering ingredients were mixed together in one diabolical broth and passed through a filter charged with sanitary carbon, the result being a perfectly clear and scentless water, not only up to the mark required by

the Pollution of Rivers Act, but superior in many respects, at all events, to some supplied for drinking purposes. The Spongy Iron Water Purifying Company exhibited many forms of their filters, but rely upon the medium of filtration, very spongy iron, entitling them to favourable consideration. The question, 'Which is the best filtering medium?' is one of very great importance to the public, and the award of the judges is looked forward to with great interest. We fail to see, however, how it is possible to apply a satisfactory test, except by experiments extending over many months. The report of the Royal Commissioners must certainly have shaken the faith of those who were previously satisfied with charcoal filters. Most of the traps, water-closets, earth-closets, etc., were described in our report on the Manchester Exhibition. Messrs. Gascoyne and Sons, Leamington, exhibit sections of hand-made D traps and cast lead D traps, to show by comparison the superiority of the latter. We admit that the cast lead are superior to those made by hand, but infinitely prefer cast S traps. Some very interesting specimens of plumbing executed on wrong principles and taken out of houses are exhibited by Mr. W. Eassie, C.E., also some examples of the effects of sewer gas and of the destruction to lead caused by rats, worms, etc. Mr. Eassie also lends a very instructive series of models, drawings, etc., of crematory apparatus.

NEW DISINFECTING APPARATUS.

OUR attention has been called to a new kind of disinfecting apparatus manufactured by Messrs. Rosser and Russell, engineers, 46, Charing Cross, which combines many advantages. Their speciality consists of a stove fixed underneath a brick chamber which gives any degree of heat from 240° upwards, with a constant current of hot air mixed with the fumes of sulphur and a special air-tight iron conveyance fitted with shelves. When a case of small-pox occurs in the district, after the removal of the patient, the vehicle is taken to the house, and the infected bedding, etc., is placed in it. The whole is then closed up and carted away to the disinfecting chamber, the iron conveyance is rolled off the horse-carriage or under-frame into the chamber, and the whole of the iron box is then opened by means of gearing, so as to allow of a constant current of hot fumes passing through the foul bedding, etc., on the shelves. The doors are then closed, and when the disinfection is effected, the whole is taken back to the house, with this advantage, that the infected matter has only once been handled (when it is put into the cart), and the cart itself is disinfected each time. On the present system it has to be put into an ordinary cart, carried through the streets, and put into the hot closet, thus endangering persons in the streets and the men engaged in the work. We recommend medical officers of health to judge of this system for themselves.

LOBB'S PATENT DRIED MILK FOODS.

WE have received samples of Patent Milk Food, and Dried Milk in combination with oatmeal, arrowroot, cornflour, rice, cocoa, and with chocolate. An analysis of the Patent Milk Food, by H. C. Bartlett, Ph.D., F.C.S., shows its composition to be—Moisture 2·73, nitrogenous matter 11·47, cane-sugar and corn-sugar, gum, etc. 20·07, sugar of milk 15·09, milk-fat, and fat from corn 8·90, starch and cellulose 30·78, ash 1·96. From this it appears that the article contains a very large proportion of nitrogenous and of fatty matters. The analysis besides proves that the milk used in the preparation of these articles is of exceptional richness, while the peculiar process not only preserves its most valuable properties, but secures freedom from adulteration of this important ingredient. All the preparations are in the powdered form, and will keep any length of time without deterioration, rendering them particularly adapted for the use of travellers by sea or land. They contain all the essential principles of nourishment in just proportions. Having practically tested the merits of all the preparations, we have no hesitation in recommending them to those who require a nourishing, really delicious, and thoroughly reliable article in the most portable form, and at the same time convenient in use. All the kinds merely require the addition of boiling water, and are ready for use in a few minutes. The composition of each sample is fully, clearly, and truthfully stated on the label. As beverages the cocoa and chocolate are all that can be desired; and many who appreciate a genuine and at the same time palatable article will doubtless hail these preparations as a boon. The Milk Food and arrowroot, and other farinaceous foods would form valuable components of the diet of invalids, infants, and children. Mr. Lobb, of the Langley Food Works, Vauxhall, is the proprietor and patentee.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

ARMITAGE, William Henry, L.R.C.P. Edin., L.F.P.S. Glasg., has been appointed Medical Officer of Health for the Over Darwen Urban Sanitary District, at 120*l.* for one year.

BIRD, Peter Hinckes, F.R.C.S. Eng., has been reappointed Medical Officer of Health for the Preston Port Sanitary District, for one year.

CRAGGS, Mr. James, has been appointed Surveyor, Inspector of Nuisances, and Collector, to the Shildon and East Thickley Local Board and Urban Sanitary Authority, Co. Durham, at 91*l.* per ann.

DACOMBE, Mr. Henry, has been appointed an Assistant Inspector of Nuisances for the Southampton Urban Sanitary District, vice Hazard, resigned.

FAUSSET, Herbert John, M.B., C.M. Univ. Dub., has been appointed Medical Officer of Health for the Tamworth Urban Sanitary District, vice Brunton, resigned, at 30*l.* per ann.

FREER, John Henry, L.R.C.P. Lond., M.R.C.S. Eng., has been appointed Medical Officer of Health for the Rugeley Urban Sanitary District, at 10*l.* for one year.

GOURLEY, Samuel, M.D. Univ. Glasg., F.R.C.S. Edin., has been appointed Medical Officer of Health for the West Hartlepool Urban Sanitary District, vice Oldham, resigned.

MAY, Mr. Henry P., has been appointed Town Clerk, etc., to the Corporation and Urban Sanitary Authority of Blackpool, Lancashire, vice Charnley, resigned, at 300*l.* per ann.

MILLS, Mr. Abraham, has been elected a Member of the Bradford Local Board and Urban Sanitary Authority, Lancashire, vice Livesey, resigned.

MORLEY, Mr. George, has been appointed Inspector of Nuisances for the Colchester Urban Sanitary District, vice Everard, resigned, at 105*l.* per ann.

POLLARD, Mr. E. R., has been appointed Assistant Surveyor to the Shipley Local Board and Urban Sanitary Authority, Yorkshire, vice Beckwith, whose appointment has expired, at 120*l.* per ann.

RAWSON, William Fell, L.R.C.S. Edin., L.R.C.P. Edin., L.S.A. Lond., has been reappointed Medical Officer of Health for the North Bierley Urban Sanitary District, at 70*l.* for one year.

ROBINSON, Mr. Joseph, has been appointed Inspector of Nuisances for the Aston Manor Urban Sanitary District, Warwickshire, at 150*l.* per ann.

THOMPSON, Mr. Thomas Linsley, has been appointed Surveyor and Inspector of Nuisances to the Kirkleatham Local Board and Urban Sanitary Authority, at 80*l.* and 40*l.* per ann.

WETHEY, Eugene, Esq., has been appointed Treasurer to the Kirkleatham Local Board and Urban Sanitary Authority.

WHITESIDE, Mr. Thomas, has been reappointed Inspector of Nuisances for the Preston Port Sanitary District, for one year.

VACANCIES.

BARNSLEY, CORPORATION AND URBAN SANITARY AUTHORITY OF, Yorkshire. Application, 22nd instant, to W. H. Peacock, Town Clerk.

GUILDFORD. Public Analyst. Application, November 2, to Ferdinand Smallpiece, Town Clerk.

KIRKLEATHAM URBAN SANITARY DISTRICT, Yorkshire. Medical Officer of Health: 20*l.* per ann. Application to M. B. Dodds, Clerk to the Authority.

LONG EATON LOCAL BOARD AND URBAN SANITARY AUTHORITY, Derbyshire. Surveyor and Inspector of Nuisances.

PERTHSHIRE. Public Analyst: 100*l.* per ann. and travelling expenses.

POPLAR DISTRICT. Medical Officer of Health for the South Division: 150*l.* per ann.

WORKSOP. Certifying Factory Surgeon.

WORKSOP URBAN SANITARY DISTRICT. Medical Officer of Health.

NOTICE.

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Original Papers.

ON THE WATER-SUPPLY OF SEASIDE WATERING-PLACES.

BY G. W. WIGNER, F.C.S.

(*Continued from p.* 232.)

BRIDLINGTON.—When I reported on the water-supply of this place,* I pointed out that the water was not filtered, although it needed it badly, and that it had a nauseous taste. Since writing that report I have received another sample from the Water Company, which is said to have been drawn from their mains at a date one month later than that which I first examined was taken. The chemical results are quite concordant with those of the first sample; there is a slight diminution of the ammonia and albuminoid ammonia, and a decrease in the oxygen absorbed; but the most satisfactory change is that the last sample of water was entirely free from suspended matter.

Returning now to the Welsh coast, our next place is PENMAENMAWR, which is a short distance from Llandudno. The population of the town is smaller than that of Llandudno, being at the last census under 2,000. The water is derived from springs and rivers in the mountains. There is a constant supply, but, unfortunately, no hydrants for use in case of fire. The water is all filtered before it enters the reservoir. My sample was drawn from the mains on September 1, and the results were as follows:

	Grains per gallon.
Total solid matter	3·80
Loss on ignition after deducting combined carbonic acid	0·90
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	1·46
Hardness before boiling, 1·2° (Clark's scale)	
,, after boiling, 1·2° ,, ,,	
Nitrogen as ammonia	0·0030
,, albuminoid ammonia	0·0027
,, nitrates	0·0420
,, nitrites	traces
Total nitrogen in these four forms	0·0477
Oxygen absorbed by organic matter	0·0480

The water had a very good pale blue colour. It was perfectly free from taste, and only had a slightly perceptible smell of a peaty character. The microscopical examination was perfectly satisfactory. The whole of the figures of the analysis, combined with the physical properties of the water, show that it is a supply of the most satisfactory character.

BANGOR is said to be supplied from springs at Aber. I am informed that the supply is not constant. The population of the place is much larger than that of either Penmaenmawr or Llandudno, but as far as I can ascertain the visitors are not in equal proportion. The analysis of my sample was as follows:

	Grains per gallon.
Total solid matter	3·30
Loss on ignition after deducting combined carbonic acid	1·30
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	1·05
Hardness before boiling, 0·9° (Clark's scale)	
,, after boiling, 0·9° ,, ,,	
Nitrogen as ammonia	0·0026
,, albuminoid ammonia	0·0045
,, nitrates	0·0400
,, nitrites	traces
Total nitrogen in these four forms	0·0471
Oxygen absorbed by organic matter	0·1220

The water was perfectly free from suspended matter, and from offensive taste or smell, while the microscopical results were again perfectly satisfactory. The only points which could be urged against the water were that it had a slightly yellow tint and a large proportion of oxygen absorbed, but from a careful examination I am persuaded that the colour was mainly due to the presence of small traces of iron, partially precipitated, which, therefore, does not impair the quality of the water.

OGWEN LAKE AND GLANRAFON SPRING appear to be used to some extent by the inhabitants of Bangor as sources of supply. I therefore obtained samples, which were drawn on September 14, and the following are the results:

	Ogwen Lake. Grains per gallon.	Glanrafon Spring. Grains per gallon.
Total solid matter	25·40	15·00
Loss on ignition after deducting combined carbonic acid	7·40	3·00
Copper—trace.		
Iron—minute trace.		
Chlorine calculated as chloride of sodium	5·85	3·16
Hardness before boiling, from Ogwen Lake, 10·8°; from Glanrafon Spring, 5·8° (Clark's scale)		
Hardness after boiling, from Ogwen Lake, 10·8°; from Glanrafon Spring, 5·8° (Clark's scale)		
Nitrogen as ammonia	0·0115	0·0042
,, albuminoid ammonia	0·0043	0·0030
,, nitrates	0·8370	0·0670
,, nitrites	traces	0·0030
Total nitrogen in these four forms	0·8528	0·0772
Oxygen absorbed by organic matter	0·0100	traces

It will be seen that the samples differ much in their chemical results. The Ogwen Lake sample had a very good pale blue colour, and was free from suspended matter and from objectionable taste, but it had a flat smell like rain-water. It contained minute traces of copper, probably not enough to be of any great importance, but still the quantity was sufficient to enable its presence to be readily determined. The microscopical examination showed much vegetable matter, but no animal remains.

The water from the Glanrafon Spring had a good colour, and was free from suspended matter, and the smell and taste were satisfactory. The volatile matter, ammonia, albuminoid ammonia, and nitrates were all lower than in the Ogwen Lake sample, and the Glanrafon Spring is, therefore, by so much the better of the two. On the other hand, both waters are greatly inferior to the Bangor supply.

BEAUMARIS is a small place, which has a population of only about 2,000, and probably as many visitors. I have not received any authentic information as to the character of the supply, but as far as I can ascertain there is a public supply, which

* See SANITARY RECORD, No. 171, p. 213.

appears to be collected from rock springs, and flows by gravitation into the town, many houses in which are, however, supplied by independent springs of their own. I was unable to ascertain whether the supply is constant or intermittent, or whether the mains are sufficiently extensive to make it generally available. I obtained a sample which was drawn on September 1, from a public office in the town, and the results were as follows :

	Grains per gallon.
Total solid matter	15·60
Loss on ignition after deducting combined carbonic acid	3·63
Lead and copper—none.	
Iron—very minute trace.	
Chlorine calculated as chloride of sodium	2·80
Hardness before boiling, 6·5° (Clark's scale)	
,, after boiling, 5·2° ,, ,,	
Nitrogen as ammonia	0·0135
,, albuminoid ammonia	0·0036
,, nitrates	0·0530
,, nitrites	traces
Total nitrogen in these four forms	0·0701
Oxygen absorbed by organic matter	traces

The sample had a very good pale blue colour, the smell and taste were satisfactory, and the results of the microscopical examination were equally so. The water is a good one.

I also obtained a sample as an illustration of the supply from independent springs, and the following are the results of an analysis of this sample, which is said to be derived from a rocky spring, and is used at an hotel in the town :

	Grains per gallon.
Total solid matter	18·00
Loss on ignition after deducting combined carbonic acid	2·19
Lead and copper—none.	
Iron—slight trace.	
Chlorine calculated as chloride of sodium	2·57
Hardness before boiling, 7·6° (Clark's scale)	
,, after boiling, 5·3° ,, ,,	
Nitrogen as ammonia	0·0025
,, albuminoid ammonia	0·0020
,, nitrates	0·2800
,, nitrites	traces
Total nitrogen in these four forms	0·2845
Oxygen absorbed by organic matter	traces

The chemical results do not differ very much from those given by the other sample, except as regards the proportion of nitrogen as nitrates, which is much higher, and would certainly seem to indicate some drainage contamination. The colour, smell, and taste were all quite as good as in the sample of the public supply. The microscopical examination showed much vegetable matter and some amorphous suspended matter, but excepting these there are no objectionable features. In judging of this water we must not forget that the nitrates are an important factor, but on the whole this private supply is only a little inferior to the public one.

CARNARVON has a population of about 10,000, and comparatively few visitors; it is reported to have a constant supply, furnished by a company who obtain the water from Quellyn Lake, at the bottom of Snowdon. This source of supply is said to have been selected by Dr. Muspratt, after an examination of various other proposed sources in the same district. My sample was drawn from the mains on September 1, and gave the following results :

	Grains per gallon.
Total solid matter	3·40
Loss on ignition after deducting combined carbonic acid	0·20
Copper—traces.	
Iron—trace.	
Chlorine calculated as chloride of sodium.	1·70
Hardness before boiling, 1·1° (Clark's scale)	
,, after boiling, 1·1° ,, ,,	
Nitrogen as ammonia	0·0020
,, albuminoid ammonia	0·0039
,, nitrates	0·0280
,, nitrites	trace
Total nitrogen in these four forms	0·0339
Oxygen absorbed by organic matter	0·0460

As regards mineral constituents this sample is extremely low, ranking in this respect next to the supplies of Morecambe, Poulton, and Bangor, while as regards the amount of volatile organic matter it is far superior to those waters. The nitrogen, as albuminoid ammonia, and in all other forms, is so low as to place the supply well up among first-class waters. The results of the microscopical examination were perfectly satisfactory. The water, however, had one fault, which appears to be general among waters containing so little total solid matter, *i.e.* it was not sufficiently aerated, and consequently had an unpleasant flat taste, like rain-water, and a corresponding smell. The trace of copper present would hardly be sufficient to be injurious to health, but it is certainly very objectionable.

PWLLHELI has but a small population, and the authorities have not yet completed the arrangements for a public supply. Most of the inhabitants obtain their supply from wells, with some of which pumps are connected ; there appear to be only about half a dozen wells in the town for the whole of the inhabitants, some of whom, therefore, use (perhaps I might almost say are obliged to use) rain-water, sometimes filtered, sometimes not. My first sample was taken on September 3 from some refreshment rooms in the town, and is said to be unfiltered rain-water. The results were as follows :—

	Grains per gallon.
Total solid matter	6·80
Loss on ignition after deducting combined carbonic acid	2·02
Lead and copper—none.	
Iron—minute trace.	
Chlorine, calculated as chloride of sodium	1·05
Hardness before boiling, 1·9° (Clark's scale)	
,, after boiling, 1·5° ,, ,,	
Nitrogen as ammonia	0·0178
,, albuminoid ammonia	0·0044
,, nitrates	0·0530
,, nitrites	0·0030
Total nitrogen in these four forms	0·0782
Oxygen absorbed by organic matter	0·0300

The sample had a good pale blue colour, and was free from smell, but when heated it had the flat taste common to rain-water. The results of the microscopical examination were quite satisfactory, and showed that the water had not been injured by storage so far as to let animalculæ grow in it. The amount of the mineral constituents, although comparatively small, was sufficient to show that the water has dissolved some small amount of matter since it fell as rain, but on the whole it was a satisfactory water.

I also had a sample drawn on the same date from one of the public pumps. I am, of course, unable to

say to what extent this pump is used, but there being, as I have before said, only about half-a-dozen in the town, I suppose it supplies a large proportion of the inhabitants. The results were as follows :

	Grains per gallon.
Total solid matter	11·20
Loss on ignition after deducting combined carbonic acid	2·00
Lead and copper—none.	
Iron—trace.	
Chlorine calculated as chloride of sodium .	5·85
Hardness before boiling, 2·7° (Clark's scale)	
,, after boiling, 2·7° ,, ,,	
Nitrogen as ammonia	0·0096
,, albuminoid ammonia . .	0·0037
,, nitrates	0·0380
,, nitrites	0·0040
Total nitrogen in these four forms . .	0·0553
Oxygen absorbed by organic matter . .	0·0100

This sample had a very good pale blue colour, and was free from suspended matter, but when warmed it had a flat and slightly peaty taste, and a distinctly offensive smell of the same character. The chemical results are certainly good, and the microscopical examination was quite confirmatory of them, but the water seems to have been naturally filtered through some vegetable strata, which have left a smell and taste; this is objectionable, even though it is probably not injurious.

PORTMADOC has a population of some 4,000 and' as far as I can judge, a fair proportion of visitors. It has a constant supply, which is always available in case of fire, and which is derived from a lake having an area of about 35 acres and situated some seven miles from the town. The engineer estimates the supply at 15 gallons per head per day, but as the sewers and urinals are flushed and the streets watered, it seems probable that the supply must exceed that quantity. The water is not filtered. I had two samples, one from a drinking fountain and the other from the station, the latter said to be derived from the same source as the former. The results of the analyses were as follows :

	Fountain. Grains per gallon.	Station. Grains per gallon.
Total solid matter	3·60	3·40
Loss on ignition after deducting combined carbonic acid . . .	0·40	0·40
Lead and copper—none.		
Iron—traces.		
Chlorine calculated as chloride of sodium	1·52	1·64
Hardness before boiling, Fountain, 1·0°; Station, 1·4° (Clark's scale)		
Hardness after boiling, Fountain, 1·0°; Station, 1·4° (Clark's scale)		
Nitrogen as ammonia . . .	0·0093	0·0105
,, albuminoid ammonia .	0·0061	0·0054
,, nitrates	0·0280	0·0240
,, nitrites—traces.		
Total nitrogen in these four forms .	0·0434	0·0399
Oxygen absorbed by organic matter.	0·1060	0·0640

Both samples had a good colour, and were free from suspended matter, and the taste and smell were quite satisfactory. The total solid matter is very low, and the water is, therefore, extremely soft; the oxygen absorbed was, however, rather high in both samples, especially in the sample from the drinking fountain. The microscopical examination showed the reason of this, by disclosing the presence of a large amount of confervoid growths. In the sample drawn from the station there was much less vegetable matter, and the amount of oxygen absorbed was also less. Portmadoc, therefore, has, except in this one respect, a satisfactory supply of water.

I am compelled to hold over until next week the reports on Barmouth and Aberystwith ; and I shall then also report on St. Anne's-by-the-Sea, Saltburn-by-the-Sea, and probably on two or three other small places, and if the space at my disposal permits I shall summarise the results of the northern counties.

(To be continued.)

CREMATION—A SANITARY INSTITUTION.*

BY W. EASSIE, C.E.

The idea of rescuing the earth from pollution is traceable from the earliest times. The Jews eschewed inhumation, properly so-called, and buried in caves and in rocks. And when pestilences overtook them, they consumed the dead in huge fires lighted in the valley of Tophet, rather than consign the infected bodies to the earth. The Egyptians, who believed in a coming resuscitation, did not either bury in the earth, but carefully embalmed the body, thus rendering putrefaction impossible. For the speedy removal of the dead, which would otherwise have engendered impurities, the ancient Persians exposed their corpses to the vultures of the air, as do the Parsees upon 'towers of silence' to the present day. They, too, would doubtless have practised cremation, had they not considered it a profanation of their sun and fire deity. The ancient Peruvians carried out, at a vast labour, a thorough desiccation of their dead, and the dried up and swathed remains were placed in cells of plaster, whole pyramids of which can still be seen. Away in far Australasia, the Chatham Islanders were accustomed to send their dead adrift to sea, so as to be speedily rid of the decaying burden. The ancient Ethiopians threw their dead into the water to be devoured by aquatic animals, and some Kaffir tribes up to the present day cast their dead into the bush to be devoured of wild beasts, for a similar reason. The same desire to preserve the earth in a pure state urges the Hindoo, who cannot afford the rite of burning, to trust his dead to the crocodiles of the sacred Ganges. In the far-off West of America, too, the aboriginal Indians sometimes set up their dead upon a tall platform, where perished out even the lower forms of existence, unknown of earth, although the depurating power of the soil must have been well known to them in the chase. Small tribes of North Americans are also found from time to time who still perform cremation as assiduously as do the Monto sects of Japan or the people of Burmah. Burial in the earth was certainly once the exception to the rule.

It is not a little astonishing that we are so enamoured of burial and its many disadvantages. It is even possible that the practice of hiding the dead out of sight arose, as the population increased, from a consultation of mere immediate convenience. No one can claim a precedence for burial over cremation. The sacrificial altar, according to the

* Read at the Congress of the Sanitary Institute of Great Britain, Leamington, October, 1877.

Mosaic record, was in vogue even before the death of a single human being, and the pristine idea of cremation and its salutary consequences might have then originated. The Creator declared that the earth cursed Cain for causing his brother's blood to mix with it, and just previous to the Noachian Deluge words are employed which almost justifies one in believing that the earth was declared polluted in this sense as much as in any other. But anything like special pleading here is, perhaps, best left unattempted. It is curious, however, that man is the only creature capable of understanding the uses of fuel. The question as to whether cremation or burial was originally intended will likely ever remain unsettled, nor does it very much matter, but the query as to what races first introduced collective interments in the earth, such as are now practised in our graveyards, is more pertinent. Certainly not the earlier races of man, so far as I can judge. There was land enough and to spare, too, for isolated burials in the plains of ancient Scythia, in the wolds of Scandinavia, in the valleys of Peru, in the prairies of North America, in the lands of India, and in the sands of Egypt, and yet direct inhumation there was next to unknown, but rather, embalming, exposure, or cremation. About the only early races which practised burial in the earth were the old lake-dwellers, for very evident reasons. And if we examine the customs of the Chinese, we shall find that they prefer isolated burials, and despite the vastness of the population, not a cemetery is there to be found. The only conclusion possible is one antagonistic to burial, as we practise it, or indeed burial in any shape, and commendatory of cremation.

How patent are the advantages of cremation, when unfortunately a huge and devastating war breaks out. Antiquity speaks aloud upon this point, and the practice of the ancient Greeks is fresh in every memory. In the wars of Castille the Saracen dead were destroyed by fire, as were the fallen on several occasions during the French and Burgundian wars. The practice is suggested as sometimes advisable by the late Professor Parkes, and it is most favourably reported upon to foreign governments by the chiefs of the medical staffs. Nothing can be more soul-harrowing than the idea of disinterring soldiers once buried for the purpose of destroying them by fire, as was done by the Belgians at Waterloo, and by the Germans lately at Sedan. Owing to the too superficial burial, also, the remains of whole hosts of dead had to be exposed again, and treated with charcoal and acids. Surely it would be better to at once openly countenance the practice of cremation upon the field of battle, say by the establishment of a Black Cross Convention. Did an opportunity occur, and I were free to visit Turkey again, I would deem it the highest sanitary duty to attempt the establishment of such a corps. I feel confident that I could reduce to ashes, by means of locomotive crematories, 10,000 bodies in as many minutes of time. It is altogether unlikely that at any time the results of modern carnage can be hidden in the earth, without polluting the underground springs and contaminating the air; and, though one would not wish to make use of the argument economical, still it may be remarked that many thousands of pounds might have been saved to this country and a great yearly expenditure, if, instead of the 130 cemeteries belonging to us in the Crimea, the dead had been reverently burnt, in imitation of the ancients, and the ashes conveyed home for a national funeral. It is to be hoped that the means already devised by Sir Henry Thompson, Professor Reclam, and many other distinguished men will before long be adopted. And if anything could lend a voice potential towards the inauguration of this much-needed reform in warfare, scenes such as have lately been visible in Bulgaria would do this. As far back as July 14 of the present year, General Tergoukassoff telegraphed to his government at St. Petersburgh that the atmosphere of Bayazid was so infected by the decomposition of the dead that a prolongation of the stay of the troops there was perfectly impossible. On August 24, the *Times* naval correspondent declared that thousands of soldiers who fell in the Shipka Pass were so insufficiently buried that protruding hands and knees could be seen in the earth heaps. On September 4 the *Daily Telegraph* correspondent reported that around Hassankioi the stenches of the villages were unbearable, that the wells were full of dead bodies, thrown in by the retiring invaders, and that water had consequently to be brought from a great distance. And on the 17th of last month the *Times* correspondent telegraphed that fever had broken out at Kezanlik, and that within 600 yards of his tent some hundreds of unburied dead could be seen, relicts of the battle which took place some weeks previously. In order to minimise the danger, the messengers passing along the Yeni Saghra road had actually to ride along with camphor in their mouths. This state of things is not only sad, but pre-eminently disgraceful. Surely it is within the free province of the great Powers to intervene in order to prevent the spread of typhus and cholera, as sure to be engendered under the above circumstances as in the Gangetic Delta. We have a solemn right to interfere from a sanitary standpoint, whatever we may have from a political one. From what I heard when attending as a delegate at the late General Congress at Dresden, it is not unlikely that the governments of Austria, France, and Belgium, if unfortunately obliged to go to war, would institute a proper cremation service.

Returning to our own peaceful island, it would be of no use at this stage of progress amongst us to dwell upon the disasters which once attended intramural interments here. Medical officers of health are now alert to seize every opportunity of closing all dangerous graveyards. A most disgraceful state of things was, indeed, reported upon at Sedgely the other day by Mr. Holland, the Government commissioner, and many more perilous spots remain not yet indexed. I have visited many of these places, and would like to forget much that I have seen. Nothing but words of commendation are due to such admirably conducted cemeteries as that at Woking. The only question is this, Have we any right to trespass so far, geographically speaking, and fill the grounds in another county, which may some day be required by near neighbours of the soil. Amongst the regrets I share, with very many others, is one that, as yet, we have no crematorium to point to, as an instalment of improvements to come. We are being even distanced in the race towards true progress by the nations abroad, who have hitherto always looked up to us as the foremost in all things appertaining to hygiene. Cremations are now permissible in Milan, in Gotha, and in Zurich. The necessary funds were provided, and a proper apparatus would have been built in the consecrated portion of the Great Northern Cemetery of London,

but for some scruples of the late bishop of the diocese. The offer having lapsed, it is to be hoped that fresh funds will shortly be forthcoming for the erection of a crematorium at some convenient place. I was greatly ashamed some months ago, when consulted by the Rajah Rampal Singh as to the cremation of his deceased Ranee, to acknowledge that, with all our vast Indian possessions, we did not possess the means of complying with the wish of a subject in this way. In a late cremation of an English subject, I was obliged to ask a personal favour from a foreign medical friend, and he in his turn to solicit one from his government, ere it was accomplished. I have just received permission to make use of the Milan crematorium should another occasion arise, but this is, I feel, very humiliating. The whole cost of an apparatus, upon the most approved principle, one which I have seen working most satisfactorily at Dresden, together with a suitable building, would but little exceed a thousand pounds, and a suitable place could easily be found for it. Here is an excellent opportunity for philanthropic adventure; one which would redound to the credit of all who embarked in it. The Cremation Society of England, of which I am secretary, would willingly undertake the erection of a proper apparatus, and arrange for the permanent working of the scheme in a self-supporting, solemn, and decent manner. The rites of religion are as appropriate to cremation as to burial, for dust to dust and ashes to ashes are thus speediest achieved, and earth soonest relegated to earth. There is nothing inimical to religious belief in cremation, although mere sentiment, born of prolonged custom, may for a short time assert its sway. I hold the adhesions of learned men of all faiths to the reform, and a brilliant future for that reform in all civilised lands is, I am persuaded, not far distant.

With reference to the number of human cremations which have been performed with the improved apparatus of the present day, I may say that I have detailed records of fourteen of these experiments. These have all been made since 1869, and eight of them during the last two years. Three were conducted at Padua with the Brunetti apparatus, three in Prussia, viz., at Breslau and Dresden, with the Reclam and Siemens apparatus, and six at Milan, with the Polli and Clericetti and with the Terrussi and Betti apparatus. Two cremations have also taken place at Washington, Penn., and Salt Lake City, in the United States, during the past twelve months, but owing to the incomplete means at hand, these were not altogether successful. The other recorded cremations were perfectly so.

I say these few words upon the subject of cremation before explaining to you the models and drawings which I have gathered together from Milan and Dresden, and which are exhibitive of the modern processes by which the rite is consummated, and I do so with the more pleasure because we are in a temple specially dedicated, for the present, to sanitation, and because I am desirous of stating that the question is simply a sanitary one. The practice originated, I am firmly persuaded, in the desire for absolute purity of air, earth, and water. The devouring element was chosen because it alone of all the elements appeared fitted for the thorough and speedy removal of the festering dead. And it has been deliberately practised by nations whom we have never yet distanced, if we have even approached them, in subtilty of intellect, nobility of soul, or appreciation of art.

Table of Cremations, 1869–1877.

Place of Cremation	Date	Sex	Age	Weight of Body	Weight of Ashes	Cost of Fuel	Time occupied	Apparatus devised by
				lbs.	lbs.	*s. d.*	min.	
Padua	Mar. 10, 1869	Female	35	116	6	...	...	Brunetti
,,	Jan. 20, 1870	Male	45	99	3·06	...	...	,,
,,	May 15, 1870	,,	50	90	4·06	2 4	85	,,
Breslau	Sept. 22, 1874	Female	Aged	70	3	3 0	70	Reclam
Dresden	Oct. 9, 1874	,,	26	...	3·75	...	75	F. Siemens
,,	Nov. 6, 1874	,,	23	...	4	...	78	,,
Milan	Jan. 22, 1876	Male	76	...	6	...	90	Polli and Clericetti
,,	April 24, 1876	Female	...	...	...	70 0*	120	,,
Washington, Penn., U.S.	Dec. 6, 1876	Male	67	...	...	30 0*	120	Le Moyne
Milan	Mar. 17, 1877	,,	72	94	8	...	90	Polli and Clericetti
,,	April 3, 1877	Female	...	...	...	...	...	Terruzzi and Betti
,,	Aug. 24, 1877	Male	...	...	...	...	...	Ordinary retort
Salt Lake City, U.S.	Aug. 31, 1877	,,	...	...	4·33	...	155	,, ,,
Milan	Oct. 1, 1877	Female	20	77	6.60	...	...	Terruzzi and Betti

* Including all labour and expenses.

SANITARY WORK IN ENGLISH SEA-SIDE WATERING-PLACES.*

BY ED. SLADE-KING, M.D., L.S.Sc.,
Medical Officer of Health for Ilfracombe.

WERE it not for our watering-places and other summer resorts, it is doubtful if the work of this country could be carried on, for multitudes of the comparatively healthy inhabitants of our large cities would soon break down under the daily strain of sedentary duties and mental worry did they not by an annual excursion, lay up as it were a stock of health capital sufficient for the year's consumption. Thus it is evident that the sanitary condition of our health resorts is a question of vital importance, not to the invalid and pleasure-seeker only, but to the well-doing of those workers and thinkers who form the back-bone of our national industries.

The Registrar-General classes together thirty-seven towns as watering-places. Scattered along our shores at irregular intervals, they present every variety of soil, climate, character, and situation, from Brighton, with its population of 100,000, to mere villages like Lyme Regis and Bognor, each contain-

* Read at the Congress of the Sanitary Institute of Great Britain, Leamington, Oct., 1877.

ing less than 3,000. The aggregate population of these watering-places is 780,000, and the area over which the districts approximately representing them extends is 652,000 acres, which is equal to 1·15 persons per acre. Their death-rate has been in ten years 20·1, as compared with 24·1 in chief towns, and 19·3 in country districts, thus very little exceeding the mortality in the country villages, though they include such large populations as Brighton, at present estimated 102,000, Yarmouth 48,800, Dover and Hastings each nearly 40,000, and many other towns exceeding 20,000. The lowest general death-rate is furnished by Bognor, 15·3. The highest by Whitby, 24·2. The density of population and the death-rate are in many cases not at all proportioned, as Folkstone, with three persons to the acre, has a mortality of 16·4; while in Beaumaris, with less than one person to every four acres, the death-rate rises to 20·7. It is a very open question, however, how far these figures represent the true death-rate of watering-places. The population is estimated on the census which is taken in April, when watering-places are, as a rule, empty of visitors; it is in the summer months that they are crowded. Yet the rates of mortality to population are not corrected by the exclusion of deaths of visitors, or of dead bodies washed on shore from shipwrecks; two causes which injuriously affect the mortality of all seaside watering-places, convincingly so if we either glance at the annual wreck chart, or, calculating the summer visitors at two millions and a quarter (day excursionists excluded), which is equal to thrice the population of the towns where they assemble, roughly estimate how many sickly and weak persons are included among them. In some towns, 15 to 20 per cent. of the deaths occur among visitors.

Let us see what is the result of the summer migration of visitors to any of our fashionable watering-places. Premising that even in the winter the initial pressure of population to houses is not less than the average of 4·98, which obtains through the country at large, as, for example, Brighton 6·23, Ilfracombe, 4·94, Scarborough 4·92, it follows that the lodging-houses and hotels must, at certain periods which come round pretty regularly, be sadly overcrowded, the excess of population being not evenly distributed, but jammed up into a very limited number of habitations. That zymotic diseases are unexpectedly imported, not only by visitors, but by lodging-house servants, washerwomen, stable helps, waiters, itinerant musicians, and the mixed multitude who throng where, without a too curious inquiry into character, money is easily earned. The personal habits of these people are but too frequently the reverse of clean or temperate, and their lodging-space more crowded than that of the visitors to whose necessities or amusements they minister. That the humble lodginghouse-keepers, not proof against the temptation of profit, are too often driven to live, cook, and sleep in their kitchen, or adopt even more eccentric sleeping arrangements in greenhouses and passages. Their children are neglected while their lodgers' wants are satisfied.

Cheap travelling and high wages have, during the last few years, brought out a summer movement among our mechanics and small shopkeepers. They naturally flock to the seaside, and are compelled to lodge in mere cottages or ill-conditioned tenement-houses, or they frequent places which, under the shelter of refreshment-house licenses, concentrate all the evils while they evade all the safeguards found in common lodging-houses. The sanitary difficulties are, we must remember, augmented by the maximum demand for water occurring at this period of a minimum, and too often intermittent supply. Then drains are unflushed, traps and syphons run dry, and shallow wells and other doubtful sources are too often resorted to for the sake of avoiding trouble or the reproach of 'What, no fresh water in the house?' from the angry lodger. The fear of driving away lodgers tempts to the concealment of infectious diseases, while the overcrowding leads to their easy spread, intensifying them and rendering immediate isolation an all-but impossible matter.

And, finally, all this overcrowding, this importation of infectious disease, this use of bad water, this neglect of children, occurs during the period of decline and minimum amount of vital action in the human system, summer and early autumn, seasons marked by an excess of small-pox, measles, diarrhœa, cholera, and diseases of the alimentary canal in general.

Rent received and rent paid are of course the two great questions in the trade of a lodginghouse-keeper; and so that he has house space to let, its quality is too often a matter of secondary importance.

A demand for cheap houses always produces a supply from builders who will meet the demand by ignoring ventilation or misunderstanding its first principles, by scamping everything from foundation to chimney top. The dangers of seaside-lodgings are a favourite bugbear to autumnal newspaper correspondents,—very often not visitors at recognised watering-places at all, but tourists who have selected for summer quarters some out-of-the-way farm-house or picturesque but dirty fishing village, where neither systems of water-supply or drainage are possible, the Ultima Thule of some sleepy rural sanitary authority. And from such experiences they fulminate a wholesale condemnation of sanitary work in English watering-places.

'Statistics,' says a recent writer, 'are like mathematics, a precise science; and when applied to facts which do not admit of complete knowledge and exact manipulation are exceedingly likely to bring out inaccurate results tending to the most false conclusions.' And I am sure that anyone who endeavours to make a separate investigation of the vital statistics of communities so small as are our health resorts will perceive that they are further subject to special influences which become an important source of error, and vitiate calculations based on such limited facts.

It is, however, safe and satisfactory to state that the sum of the vital statistics of our watering-places, injuriously affected as they are by the hindrances and errors which I have mentioned, compares very favourably with the sum of the statistics of country districts at large, tested by general mortality, infant mortality, or the activity of zymotic disease; and that the opinion of the Registrar-General, so recently as two months ago, is that they are in the aggregate comparatively healthy. He, however, added this curious statement, that among the 2,188 sub-districts of England, the skilful will find places as healthy or even healthier than those which are now places of summer resort. We may fairly ask how long would they retain this good character if flooded every year with visitors and invalids, or if weakly strangers selected them as a residence? The returns issued by the Local Government Board show that the

money expended by local watering-place authorities on permanent sanitary works is *pro rata* nearly 18 per cent. in excess of the proportion which has been so expended through England at large, and the salaries paid to the sanitary officers are decidedly more liberal than in many towns. The collective opinion, too, of the medical practitioners in our watering-places is that epidemic diseases have diminished, and the sanitary condition of lodging-houses much improved during the last ten or twelve years—an opinion in which the very limited personal experience afforded by the one watering-place within my own sanitary district enables me to concur. The most sanguine, however, must admit that the reputation of our health resorts should be, like that of Cæsar's wife, above suspicion, but that much still remains to be accomplished before this desirable point is reached. No town has as yet had the courage to adopt the sanitary registration of lodging-houses suggested in the excellent circular of the Social Science Association. It implied a hope that lodginghouse-keepers would be the first to move in the matter, and invite an inspection of their defects, or, in other words, voluntarily have their own rents raised, and the number of their lodgers diminished, —a policy which, however well it would pay in the future, would be a present loss. It is not reasonable to expect this. The reform must come from the outside. The instruction of the people's opinion in sanitary matters rests in the hands of the medical profession and of the medical journals; and if we so determine, we can teach them to make such reasonable demands as these. That within any given district being a health resort, no license of any hotel shall be granted or renewed without a certificate of its being in a sanitary condition in the fullest acceptation of the words. That no license shall be given or renewed to a refreshment house unless a certificate of a similar character be obtained every six months. That no refreshment-house license shall in any way permit the holder to avoid the responsibilities of the Common Lodging-house Act. That all seaside sanitary authorities should be compelled to provide hospital accommodation for infectious disease, and adopt a by-law preventing the habitation of new houses without a certificate of sanitary fitness. The authorities of Ilfracombe, Torquay, etc., have already done this. That information to the sanitary authority of all infectious illness occurring in hotels, refreshment houses, and lodging-houses should be compulsory. That any doubt as to the power of house-to-house inspection under section 92 Public Health Act, 1875, should be settled in the affirmative. With regard to private lodging-houses, sections 128 and 129 of the Public Health Act have already done much to prevent the spread of infectious disease. Section 90 of the Public Health Act seems to have been framed rather in advance of public opinion, and I am not aware that it has as yet been acted on in any of our health resorts. It applies expressly to houses let in lodgings which are not within the provisions of the Act relating to common lodging-houses. And though the Local Government Board have not in their new model by-laws as yet framed a chapter in accordance with it, it is probable they will do so. It is capable of a selected local application, and seems to provide for an important series of regulations in connection with lodgings of the class used at health-resorts. An unsatisfactory death-rate in some districts containing numerous lodging-houses must sooner or later occur, and give opportunity to put in force and test the value of section 90, or rather of the by-laws which are capable of being framed under its various clauses, and which would probably meet all difficulties without the delay of fresh legislation.

Sanitary officers agree that visitors every year take more intelligent interest in sanitary matters; a vast majority of hotel and lodginghouse-keepers now welcome their visits, and gladly carry out their suggestions. It is only on a small residuum that any further pressure could be required. But the carelessness of a very few may injure the best-earned reputation of a town. Sanitary errors may pass unnoticed in many a district, but there is no chance for the wrong-doing of a watering-place to escape the watchful eye of the British tourist or the publicity of his pen. Maternal legislation is a mistake; we do not go so far as to ask for the taxation of the lodging-house cat, or that cooks should produce certificates from the South Kensington School of Cookery, but we do ask the support of public opinion in our honest endeavours to surround tourists abroad with the same sanitary safeguards which they so justly value in their own houses. English watering-places have special difficulties to contend with, but they are not insurmountable; they have the advantage of the sea for the disposal of their sewage; they are mostly new built, free from narrow lanes, blocks of unhealthy tenements and squalid courts. Their populations are better clothed, lodged, and fed than agricultural labourers, and follow occupations more healthy than miners and manufacturers; and from the intelligent zeal of most of their health authorities, there is every reason to expect that the name of a health resort will soon be synonymous with a very high sanitary standard, and be held as an example which other districts may well follow.

It is an encouragement to see that our native watering-places have far outstripped all foreign cities in their sanitary arrangements, and are far safer resorts for children and young persons who are so specially liable to the infection of disease.

Local sanitary authorities are reflections with slightly deeper colouring of the opinions of those who elect them, and we can see in such a report as that just published by Mr. Netten Radcliffe of the condition of one of our most charming seaside towns, how useless the most careful sanitary legislation is unless supported by public sympathy, and I venture to submit that what is now most required is not further legislation, but pressure on local sanitary bodies to carry out faithfully and intelligently the powers they already possess?

A MEMORIAL has been presented from the Metropolitan and National Nursing Association for providing trained nurses for the sick poor to the Lord Chancellor, who has been directed by the Queen to frame rules for the future administration of the Royal Hospital of St. Katherine by the Tower. The memorialists submit that it would be strictly in accordance with the intention of the founders and with the past history of the hospital if a nurses' home for the benefit of the sick poor were established in connection with it in the East of London, and if a portion of its funds were applied to the maintenance of such an institution; and that in the event of his lordship thinking fit to establish one or more nursing homes in connection with the hospital, the said memorialists are prepared to undertake the management and supervision of such homes, under such rules as might be deemed suitable.

THE
SANITARY RECORD.
FRIDAY, OCTOBER 19, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

AN 'UNHEALTHY AREA' IN SHEFFIELD.

So long ago as October last, an influentially signed requisition was served upon the medical officer of health for Sheffield, complaining of the unhealthiness of a certain area within that borough. The area has been since surveyed and thoroughly inspected, and Dr. Griffiths, the medical officer of health, has recently presented to the town council his report thereon, which contains a detailed examination, both of the results of the inspection, and of the mortality statistics for the area during 1876. It appears that the requisitionists did not consult the medical officer as to the selection of the area which they seek to condemn, and he expresses a doubt whether the area includes the most unhealthy parts of the town. However this may be, the report just issued establishes the undoubted claim of this area, or at any rate of its larger part, to the benefit of the Artisans' Dwellings Act. The area includes no less than 127½ acres, and for the purposes of his report, Dr. Griffiths, for statistical purposes, divides this area into eleven blocks, varying in size from 5 to 25 acres. It appears that nearly 70 per cent. of the houses standing on this area are of the back-to-back type, having no back doors or windows, and consequently no through-ventilation. The tables show that as regards privy accommodation, there was but one privy to each 11·8 persons, and to each three houses; further that more than half the ashpits were uncovered. The mortality statistics of the area during 1876 are full of interest, and are the more reliable inasmuch as they relate to a population of 23,261 persons. The rate of mortality was equal to 35·3 per 1,000, after due correction for the deaths of residents occurring in public institutions situate outside the area. In the rest of the borough, the death-rate did not exceed 23·2 per 1,000; hence, in equal numbers living, 152 persons died within this unhealthy area during 1876, to each 100 deaths recorded in all other parts of the borough. As regards the death-rate from the seven principal zymotic diseases, which averaged 4·8 per 1,000 living in the entire borough, it was equal to 6·0 per 1,000 within this condemned area; the zymotic rate within this area, therefore, showed an excess equal to 30 per cent. upon the rate from the same diseases in the rest of the borough. The zymotic rate did not show so large an excess as did the death-rate from all causes; in two of the groups, however, the zymotic rate was equal to 9·6 and 9·8 per 1,000, the corrected death-rate from all causes in these groups being equal to 46·9 and 42·6 per 1,000 respectively. It is to be regretted that Dr. Griffiths was unable to include in his report any statistics of infant mortality within this 'unhealthy area;' there are few tests of sanitary condition more sensitive than that of infant mortality, and in the present day the birth and death registers afford satisfactory means for calculating the proportion of deaths under one year to births for any area selected. Dr. Griffiths, while acknowledging that the condemned area 'includes a considerable proportion of dwellings that are inimical to the health of the resident,' urges that there are 'localities immediately co-terminous with the district included in the report which are equally bad, and should not be omitted in any scheme for improving the dwellings of the poor in Sheffield.' The health of Sheffield has in recent years showed a marked improvement, but there is no reason to doubt that the rate of sanitary progress in the town would be much accelerated by the liberal application of the provisions of the Artisans' Dwellings Act to its worst parts. It is eminently satisfactory, therefore, to find that the Town Council has decided, by a large majority, to take immediate action on Dr. Griffiths' report.

SCIENCE AND SANITATION.

THE Sanitary Congress at Leamington was successful so far as regards the audiences obtained and the amount of public attention it received. We sincerely hope much good may arise from it. We would, however, point out to the Society that has assumed the rather high-sounding title of 'The Sanitary Institute of Great Britain,' the advisability on future occasions of a more careful consideration of the audiences they are likely to command. The Institute has enrolled as members men of various professions, many of high standing and attainments, and it will undoubtedly be conducive to its success that they should meet and fully discuss sanitary science in all its branches, but when the Institute goes abroad, marches to the strains of martial music, holds meetings in pump-rooms at fashionable watering-places, invites the public generally and the softer sex particularly, the aim should be to popularise science by giving the results of study and investigations rather than to make an opportunity of introducing unproved theories only capable of being understood by the advanced scientist.

With the knowledge of the fact that the majority of people are unacquainted with even the rudiments of physiology, we ask what practical use is likely to follow a discourse upon the 'germ,' the 'glandular,' or any other new theory of disease? Let such subjects

be discussed at pathological societies, and when the truth of any theory is clearly established then publish it to the world. If it be understood that dissertations, such as we are speaking of, and purely technical papers are to be the order of the day, the audiences whom it is sought to benefit will soon cease to attend, and the first objects of such congresses be frustrated.

Notes of the Week.

THE Salford Corporation have decided to obtain an engineer's report on the best method of preventing floods in the Irwell.

THE Middlesborough Guardians and Rural Sanitary Authority have been invested with urban powers within the contributory place of Thornaby.

THERE were sixty-three applicants for appointment as Surveyor and Inspector of Nuisances to the Kirkleatham Local Board and Urban Sanitary Authority, at 120*l.* per annum.

OUR lively contemporary *Figaro* says: 'Aberdeen is already convalescent, thanks to its granite constitution, from its late severe attack of Social Science. The local Lord Provost is also as well as can be expected.'

THE local board of Southborough, between Tunbridge and Tunbridge Wells, is experimenting with Dietz's patent lamps for burning paraffin oil, as a substitute for gas. The pecuniary saving is estimated at 1*l.* per lamp per annum.

LORD KINNAIRD, at a meeting of the Perthshire Commissioners of Supply, according to the *Glasgow News*, objected to the employment of an analyst for the county on the ground that the appointment was only made in order that the gentlemen of the county might be enabled to get good whisky.

THE Leith Town Council are about to undertake a scheme for the improvement of one of the old parts of the town, which includes an area inhabited by about 7,000 persons. The first outlay is estimated at 274,000*l.*, and after re-sales it is expected that the net cost to the town will be 100,000*l.*

THE following have been elected the first Local Board and Urban Sanitary Authority at Wirksworth, Derbyshire —namely, Messrs. William Shaw, Philip Hubbersty, Thomas Newton, Benjamin Street, G. H. Wheatcroft, Thomas W. Hunt, W. H. Watterson, Richard Wall, and John S. Hall.

THE village of Southborough, together with the adjacent ones of Berdwell and Blacker, have been supplied with water by an extension of the mains of the Barnsley Waterworks Company, the water being furnished to every house. The contract has been carried out by Mr. Skelton, of Sheffield, and the pipes were supplied by the Staveley Iron and Coke Company. The total cost has been about 3,000*l.*

THE following is the list of those who have passed the Cambridge University examination for sanitary science certificates :—F. W. Barry, M.D., Leith; J. Brown, M.D., Fraserberg, Cape of Good Hope; C. A. Cameron, Dublin; A. H. Downes, M.D., Shrewsbury; A. Genders, M.D., Normanton; R. P. Taaffe, M.D., Brighton; S. J. Thomson, M.R.D.S., Indian service; W. N. Thursfield, M.D., Shrewsbury; J. N. Wilson, M.B.C.M., Rochdale.

THE City Lands Committee have recommended that the executors of the late Mr. Alderman Besley should be allowed to remove the two obelisks at the northern end of Aldersgate Street, and erect in lieu thereof two drinking fountains, combining therewith obelisks to mark the boundary of the City's jurisdiction.

THE dispute between the Worksop local board and Mr. Foljambe, M.P., as to the disposal of sewage, has now been settled. Mr. Foljambe agrees to allow the sewage to be pumped on to certain of his lands free of cost to himself and the board, and to indemnify the latter against any indictment for nuisance. He will then himself dispose of the sewage. Each side had incurred about 300*l.* costs in the dispute, and the local board have now agreed to pay the whole of the expenses.

PRACTICAL USE OF THE TELEPHONE.

AT the late meeting of librarians, Mr. Justin Winsor said that for the purposes of interchange between head libraries and their branches in America, the telephone is already largely used. It is no longer a mere toy in that country. The branch librarian asks for a book through the telephone, and the volume is sent up by express.

LEAD IN AERATED WATERS.

A SCOTCH chemist has been convicted of having sold citric acid adulterated with lead to a considerable extent. Possibly this may explain how it is that some makers of artificial waters, and especially of lemonade, have been unable to get rid of the poisonous ingredient of lead in their aerated waters, notwithstanding that they have taken some trouble to exclude the use of lead pipes and fittings from their factories.

A MALIGNED PARISH.

AT a vestry meeting at Bermondsey, on the 1st inst., one of the vestrymen called the attention of the vestry to the medical officer's report, in which it was pointed out that the death-rate of the parish during the past fortnight was only 14 per 1,000, whilst that of the metropolis was 18 per 1,000. There was a general impression abroad, and especially by travellers on the railways passing through the parish, that it was a very unhealthy one, whereas the reports of Dr. Dixon showed that it was one of the most healthy in the metropolis. Mr. Sharpe, the gentleman who made the above remarks, thought it would be well if the medical officer would bring up a report showing how the death-rate of the parish compared with others in the metropolis, and moved a resolution to that effect. Mr. Sharpe would probably endorse the sentiment of the immortal tanner who enunciated the now 'household word,' that 'there is nothing like leather.'

SCARLET FEVER IN STAFFORD.

SCARLET fever is still prevalent in Stafford, but not quite to the extent it had reached a week ago. It is principally confined to the poorer classes, and where proper sanitary measures are quite impossible. Isolation is out of the question in this case, in consequence of whole families being ill at the same time. Disinfectants are supplied by the sanitary authorities gratis, on application, but unfortunately many will not take the trouble to obtain them. The type of disease is severe; most of the cases are children, and out of about 120 cases now in Stafford, eleven only are adults. Scarlatina anginosa is the form it takes five times out of six. Many of the patients die from the simple fact that, in consequence of their surroundings, very little can be done for them in a medical point of view; consequently the mortality is very high. There are very few cases amongst the well-to-do artisans, and it is only in the lowest parts of the town where the disease is at all prevalent. The town authorities have orders to cleanse and whitewash all houses where the disease has prevailed, if they can ascertain the localities.

Special Reports.

PAPERS READ AT THE CONGRESS OF THE SANITARY INSTITUTE OF GREAT BRITAIN.

(*Continued from page* 241.)

ON TURPENTINE AND TEREBENE AS DISINFECTANTS. By T. MOFFATT, M.D., F.G.S., etc.

SOME years ago, while performing experiments with a view to ascertain whether flowers and their essences have any action upon the air while under the influence of the sunbeams, I perceived that oil of juniper and turpentine acted upon the oxygen and produced ozone. Since then, terebene, a substance obtained by the action of sulphuric acid upon turpentine, has been introduced, and is now, I believe, extensively used as a disinfectant. The disinfecting power of terebene is said to be owing to its developing ozone. Ozone is nature's disinfectant. It is a highly oxidised body, and it is readily dissipated by oxidising oxidisable substances, such as the products of decomposing animal and vegetable matter. Turpentine, however, is a much more active ozoniser than terebene, and must therefore be a more effectual disinfectant. For the purpose of comparing the ozonising power of oil of juniper, turpentine and terebene, I put an ounce of each into glass vessels, from the covers of which ozone test papers were suspended. In ten minutes the tests in the vessels containing oil of juniper and turpentine gave signs of ozonic action; while that under the action of terebene showed no change. In the course of an hour these tests showed ozone to the amount of eight of my scale for turpentine and oil of juniper, and only one for terebene. Terebene is used as an atmospheric disinfectant, by diffusing it in the form of spray through the air by means of a spray bottle. To test its ozonising action in the form of spray, one ounce of terebene was diffused through 500 cubic feet of air—an ozone test paper was suspended for twenty-four hours in the apartment, but no indication of the formation of ozone was produced. The same quantity of turpentine was introduced in the same way, and an ozone test paper suspended in the apartment. In the course of twenty-four hours a decided trace of ozonic action was perceived. Test papers, however, placed upon furniture upon which spray had fallen like dew, became coloured. Test papers fastened to furniture, upon which the spray fell, show a much deeper tinge than those tests which were exposed to the spray only. Dr. Richardson, in his lecture on Hygeia, refers to the polishing of furniture with bees-wax and turpentine, by which the air in apartments is rendered fresh and ozonic. With the exception of phosphorus, I know of no readier or cheaper disinfectant—as far as ozone is a disinfectant—than turpentine, and I know of no better mode of applying it than in the form of the old fashioned furniture polish, bees-wax and turpentine. Upon a piece of furniture just polished, I inverted a jar, having an ozone test paper suspended in it, and in a quarter of an hour the test paper was tinged; I allowed it to remain six hours, and it was then coloured six of my scale. The ozonising action of the polish continues nearly as active at the end of a week as it was on the day of application. From these experiments we learn that oil of juniper and turpentine by their action upon the oxygen of the atmosphere develop ozone, and that they do so more actively than terebene. Turpentine mixed with bees-wax forms a disinfecting furniture polish, the application of which has this advantage over other disinfectants, the mode of application removes all accumulations of dust, and destroys all germs of disease. I would suggest that all furniture, especially of bedrooms and hospitals, should be made of pine wood, and that it and all skirting boards and panelling should be thoroughly polished at least once a week; and I advise that all cesspools and the like should be surrounded with fir trees and shrubberies of the common juniper.

ON THE NEW ARTESIAN WATER-SUPPLY AT LEAMINGTON. By HORACE SWETE, M.D., F.G.S., F.C.S., etc., etc.

THE history of the new Artesian supply of water for Leamington may be shortly summed up. An insufficiently filtered river water, impure to the eye and disagreeable to the palate; a few cases of fever, followed by a general panic; a general laudation of so-called pure spring water in private wells, which analysis soon demonstrated to be far worse and more polluted than the discoloured river water, led to the determination of a few to discover, at any reasonable cost, a supply of deep spring water. The present Mayor of Leamington, sometimes with a few trusty followers and sometimes alone, was determined to exert all his energies in securing this great boon to the town. The very fact of Leamington owing its existence as a town to its saline springs, added difficulties which seemed insurmountable. The first experimental boring was not long in tapping not water but salt, and the 'I told you so's' were certainly enough to discourage the most sanguine. The fact, however, of there already being at the Brewery, in the upper part of the town, a deep well of pure water, determined Mr. Bright and his water party to persevere. Fresh borings were made, and success has attended these from the first. A pure water, more and more copious as the borings went deeper and deeper, demonstrated the scientific correctness of the inference that Leamington was on a great water-bearing strata, and ultimately to achieve the triumphant success of being able to pump up two and a quarter million of gallons of water in the twenty-four hours. The well, or more properly speaking, wells, have been sunk through the marl in the brickfields to the sandstone beneath. The original shaft is 8 ft. in width and 100 ft. deep, with a borehole of 135 ft. below the shaft. The second shaft is 20 ft. in diameter, 100 ft. deep. The top 25 ft. are bricked and puddled, so that no surface water can drain through. The next 35 ft. are bricked, with slits for the water to enter the shaft; the remainder is through the rock. These two shafts are 60 ft. apart, connected with an adit 6 ft. by 4 ft. The principal amount of water flows in 96 to 100 ft. below the surface, the water-bearing strata being here 16 ft. thick. This sandstone is a very fine white sand. The boring commenced by passing through 11 ft. of red marl, now covered by 5 ft. of made ground, into the grey sandstone. The beds are of nearly alternate sandstone, blue bind and blue marl. About 20 ft. of the bottom of the 20 ft. shaft a 5 ft. bed of sand, with ironstone, was passed through. This, however, does not affect the water, as I have not found any trace of iron in the water. The borings terminate again in marl. The geological stratum is that called the Keuper sand, the borings at Coventry being in the Lower Permian, which exists about 900 ft. below the bottom of the Leamingon borings; that is to say, it would require the boring to be continued 900 ft. deeper to arrive at the Coventry water-supply. The sandstone rocks in England consist of the Upper and Lower Keuper sand, the Bunter sand and the Lower Permian; all these strata are remarkable for their water-bearing properties—whilst the slight angle of dip ensures a very large area of watershed and sandy area of filtration. The quantity of water supplied from these strata is very considerable. The Potteries waterworks, in Staffordshire, yield three million gallons daily; the green well at Liverpool two and a half millions, and on deepening the borehole nearly three and a half million gallons. At Manchester and Salford upwards of six million gallons a day are pumped from various wells in the sandstone rocks; whilst at Birmingham two millions are thus obtained, so that the quantity obtained in Leamington is not an ephemeral supply, but one that may be depended upon if the increase of population should at any time require so great a supply. At present 800,000 or 900,000 gallons are ample for all purposes, supposing all private wells were at once closed. The condition of the present town supply,

filtered river water, has for some time past been steadily improving; from 24 parts per million of albuminoid ammonia it has dropped down to ·09. It is not improbable that this improved condition of the river water is due to the borehole. The many millions of gallons of water pumped into the river clos 'to the intake must necessarily make a marked improvement in its condition. Of the private wells I can say little or nothing that is good. Out of 139 analysed by me during the last two years, 104 wells were so bad that they have been closed by the authorities. Last Christmas I reported to the Town Council the analysis of 100 wells taken from various parts of the town by the sanitary inspector. These waters were sent to me labelled only with a number, so that I was ignorant of their locality till after the analysis was completed. The results of these were as follows: First class waters, 1; second ditto, 29; dirty waters, 70. I do not find, however, that Leamington stands alone in being possessed of filthy wells. In other districts, where I hold the appointment of analyst, I find the same result. The fact is, the ordinary house wells are emphatically bad, and I would reiterate the advice given by Dr. Hill to the people of Birmingham last Saturday. If you are unfortunately obliged to drink well water—boil it! The portion of the rain that does not find its way to the river after fertilising the land, filters through the soil to the strata beneath, and, as I have before shown, is the source of our deep water-supply. Now, in chemically examining waters, the water-butt would give us a large quantity of organic matter, with little or no mineral matter, except soda salts, which are always present in the atmosphere. The lake, or stored waters, would present a little more mineral matter, dissolved from the side and floor of the lake. The river water still more, but in the deep well we should expect to find the greatest quantity of mineral matter, and that its composition would differ, as to the strata it passed through, 1. As to the total amount of the mineral matters; 2. As to the composition of their contents; 3. As to the amount of organic matter; and 4. As to the amount of nitrogenous matter. The gases dissolved in the water would form an item in a more elaborate analysis, but practically it is sufficient to know that the water is well aerated. Such a complete analysis as this is, however, too great a tax on the time of the medical officer of health, who may not have had the opportunity of making himself practically acquainted with the intricacies of analysis, nor be possessed of the necessary implements for its performance. Some few salient points in the constitution of a drinking water may, however, be safely arrived at, and from these we may form a fair opinion as to the wholesomeness of the water examined. The total solids, by some called mineral impurities, should not exceed 30 grains to the gallon, and I do not consider, myself, a water with less than 15 grains to the gallon a wholesome water, though it be a pure sample. These mineral matters should consist mainly of lime salts, in the form of carbonate or sulphate; magnesian and soda salts should only form a small proportion. Iron is not unwholesome in small quantities; but lead, copper, or arsenic, even in very minute quantities, would be sufficient to condemn the water. In this district most of the deep waters contain silica. Now the analysis of the mineral ingredients of the artesian supply in Leamington gives the following results:

Total quantity of mineral solids, 27·7 grains per gallon.

Sulphate of lime	7·73
Carbonate of lime	13·10
Silica	1·30
Chloride of sodium	1·82
Chloride of magnesia	1·40
Nitrate of soda	1·10
Alumina	a trace.
Loss, principally water in combination	1·25
	27·70

Nearly the whole of the lime exists in solution in the condition of bicarbonate, and is deposited on boiling, forming what is known as the furring of kettles and boilers. There is no trace of organic nitrogenous matter in this water. It will be seen, therefore, that the water fulfils my ideal of a wholesome water. The well at the brewery, in the Rugby Road, contains rather less sulphate of lime in proportion to the carbonate; the total solids being 28 grains per gallon. It is also entirely free from organic nitrogenous matter, there being only one-hundredth of a millionth part of albuminoid ammonia. Both these waters are derived from the same sandstone formation, and bear out each other's reputation for purity. The chlorides are easily estimated, and become an important item in many waters. Where saline waters do not exist, a large amount of chlorine will inevitably point to sewage contamination. Here the amount for a sandstone water is small, 1·8; being equivalent to 3·22 grains of chloride of magnesium and soda. The amount of nitrates is considered by some authorities to be a very important item, one school of chemists quoting them as 'previous sewage contamination.' Now it is perfectly true that nitrates in a river water are mostly formed from oxidised nitrogenous matter, and that this nitrogenous matter is derived from sewage pollution, yet deep wells contain nitrates where the sewage contamination must have been 'previous' to many hundred thousand years. Certainly, if these nitrates in the Leamington artesian well water were derived from the sewage of the Labyrinthodon, the monster frog of the sandstone era, the jaws and skull of which found at Leamington may be seen in the Museum at Warwick, we may drink our new water without much fear of the 'previous sewage contamination' doing us much harm. It is more probable, however, that the nitric acid was formed by some electrical decomposition of the atmosphere, which may have been, to support the life of these frogs, even more diluted with nitrogen than it now is, without rendering necessary the hypothesis of sewage contamination to account for its presence. By far, however, the most important determination the sanitarian has to arrive at in water analysis is the estimation of the nitrogen as derived from organic matter. This has been greatly facilitated by the investigations of Professor Wanklyn, who has taken advantage of the method of what is called Nessierising the ammonia, first introduced by my old fellow-student, Mr. Hadow, of Bristol, into the laboratory of King's College. The Nessler test consists of corrosive sublimate dissolved in iodide of potassium, and made strongly alkaline with caustic potash. This will strike a deep brown colour with very minute quantities of ammonia, so that even the presence of a five-thousandth part of a million may be made apparent. This process is performed by distilling from a known quantity of water an aliquot part, and testing it with the Nessler test. The colour produced is compared with a standard solution of ammonia, so that the number of parts per million may be easily read off; this is called free ammonia—that is to say, ammonia existing as such in the waters, and produced almost entirely by direct pollution of sewage or animal matter. The sample of water in the retort is then mixed with a solution of permanganate of potash, with caustic potash to break up the component parts of organic matter containing nitrogen, and form them into ammonia. The distillation is again proceeded with, and the ammonia this time read as albuminoid ammonia. It is so called because albumen or white of egg treated in this way will form ammonia, and because any other substance containing nitrogen, animal or vegetable, acts in the same way. It is called albuminoid, or like albumen. Tobacco, tea, sewage, etc., will thus give off ammonia, which is again estimated by the Nessler test. It is found that one-tenth of a millionth part of such ammonia is prejudicial to health. And if from sewage then there is the increased danger of disease germs being carried by the sewage into the drinking water. Polluted water is a fertile cause of typhoid, diarrhœa, and even cholera. Now, looking, at the present and future supply of water at Leamington, the town water contains 40 grains of solids per

gallon, no free ammonia, and at present ·09 of albuminoid ammonia, but is more frequently ·15. The wells show 1 per cent. of waters, with the total solids under 50 grains per gallon, the free ammonia below ·02 and the albuminoid under ·1; 29 per cent. where the free ammonia is under ·02 and the albuminoid ·1, but where the total solids exceed 50 grains to the gallon; 9 per cent. where the free ammonia exceeds ·02 and the albuminoid ·1, which are suspicious waters; 29 per cent. where the free ammonia was ·05 and albuminoid over ·10, being bad waters, and 32 per cent. where the free ammonia exceeded ·1 and the albuminoid ·15. I think, then, we must see that the present water-supply of Leamington is far from satisfactory, whilst the future is that of a good, wholesome, and sparkling water, and copious in quantity.

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

OVERCROWDING.

(*To the Editor of the* SANITARY RECORD.)

SIR,—In reply to your correspondent 'B,' page 207, I may state that in my district the following by-law (with others) made under the Public Health Act, 1875, section 90, is in force:

'Every lodging-house keeper shall allow a clear space of 350 cubic feet at least in each room for every person, whether man, woman, or child, so occupying it, and in cases where the same room is used as a living and sleeping room he shall allow an air-space of not less than 450 cubic feet for each such person.'

And that, when the inspector is visiting private houses, he measures their capacity according to this scale. We act on the assumption that, as the Local Government Board have allowed this scale for a lodging-house, it cannot be unreasonable for private houses. M.

THE WATER-SUPPLY OF SEASIDE WATERING-PLACES.

(*To the Editor of the* SANITARY RECORD.)

SIR,—I fear that if I replied fully to Mr. Jackson's letter in your number for the 12th inst. my reply would almost amount to writing a new treatise on water analysis, and it does not seem to me that this is at present requisite.

My own opinion is strongly in favour of the mode of statement of the results of analysis which I adopt, and I am glad Mr. Jackson agrees with it, but it is only fair to say that this opinion is not shared by all, and, with your permission, Sir, I shall, when my series of papers are finished, try to explain clearly why I prefer this mode.

I certainly do use Professor Wanklyn's mode of estimating albuminoid ammonia; no other process known at present can in my opinion satisfactorily replace it for the determination of this factor in the analysis, because, even supposing that the organic nitrogen yielded by the Frankland and Armstrong process were a positive quantity, instead of a quantity needing a heavy correction for personal equation and for impurities in the chemicals used; yet the danger of error involved in the process, and the risk of contamination by atmospheric impurities, are in my opinion sufficient to prevent it from ever coming into general use, and unless generally used it is undesirable for reports which appeal to public sense and public understanding.

I differ, however, a little from Professor Wanklyn in the way in which I conduct the Nesslerising, as I consider Mills's new colorimeter, as described in *The Analyst* for June 1877 (*i.e.* since the last edition of Professor Wanklyn's 'Water Analysis' was published), is an improvement on the old-fashioned Nessler glasses; its use saves time, and enables the relative intensities of colour of two different solutions—that is, the standard solution and the distillate—to be read off more quickly and with greater accuracy.

I am sure that the importance of the determination of nitrates in shallow well waters has been underrated. The Indigo process is quick and readily available, and, after trying some scores of samples by this process and the Crum process, side by side, I have come to the conclusion that, with proper manipulation, the indigo process is the more accurate of the two. Nitrates in a deep well water represent fossil excreta, but nitrates in a shallow well water represent recent excreta, and therefore the strong probability that drainage matter, in some form or other, has recently passed into the well. Nitrates, therefore, are not so much the actual measure of the present injurious quality of the water as of the risk which is inevitably incurred in allowing any drainage matter whatever to enter a well which is used for drinking purposes. It is quite possible that a man in perfect health might drink filtered sewage for a time without positive harm—and I have, indeed, known of such cases—but directly any predisposition to disease exists the poison acts and acute illness sets in.

Following the same train of reasoning, nitrites are still more objectionable, for the contamination has been more recent, and oxidation is consequently less complete. Therefore there are many cases where a sample of water must be condemned on the evidence of nitrates, nitrites, and the microscope only.

I do not think I over-estimate the importance of the presence of large quantities of salt in drinking-water. Water is used as a means of quenching thirst, but I think if Mr. Jackson puts a ½ oz. of salt in a gallon of water and uses that water as his drink for a few days—not only when he wants water alone, but for whisky-and-water or tea—he will find his thirst increased instead of diminished. The taste of a liquid containing even 30 grains of salt per gallon—*i.e.* one quarter of this quantity—is perceptibly saline when the liquid is warmed. I think also I need hardly remind Mr. Jackson that the analysis does not show whether the salt is derived from sea or sewage.

As to the oxygen absorbed, I consider this in some cases an important factor in reporting on the results. I estimate it by a standard solution of permanganate of potash, allowed to act for three hours, and titrated back with hyposulphite of soda. The process was published some ten years since by the late Dr. Miller, and was, if I remember rightly, devised by Mr. Vernon Harcourt. Permanganate applied in this way is often a valuable guide, but in my opinion permanganate alone used in the ordinary rough-and-ready way is a delusion and a snare.

Replying to Mr. Jackson's last question, I prefer to use a deci-gallon for the distillation, but this must not by any means be held to imply that I think that quantity essential, as good results can be obtained from half that quantity.

G. W. WIGNER.

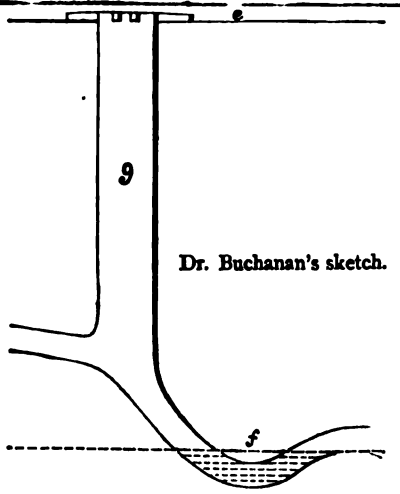
79, Great Tower Street, London,
October 15, 1877.

HOUSE DRAINAGE IN RELATION TO HEALTH.

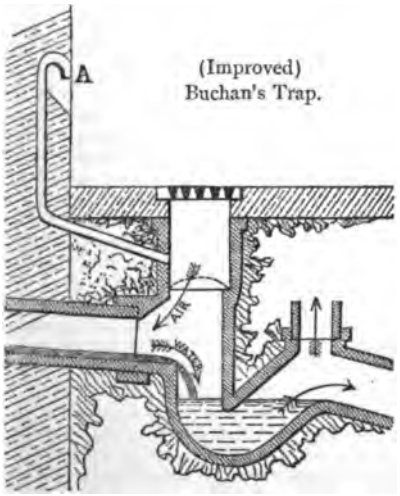
(*To the Editor of the* SANITARY RECORD.)

SIR,—In his address upon the above subject lately delivered before the Domestic Economy Congress, recently held at Birmingham, I observe Dr. Alfred Hill stating: 'The peculiar dip and arrangement of the pipe were, I believe, originally suggested by Dr. Buchanan in his report on the epidemic of enteric fever at Croydon in 1875.' Now so far as I can judge, that is a mistake. Dr. Buchanan at page seventy of the annual report to the Local Government Board, published in 1876, did, indeed, give a drawing of a ventilating trap with a dip, but the sketch is rather rude, and a little faulty, the details, from defective practical knowledge I suppose, not being properly worked out. Dr. Buchanan, in fact, states that he leaves 'constructive details to others.' It so happened,

however, that I had the constructive details all worked out and the trap in actual working, and also patented in April 1875. So Dr. Hill will perhaps excuse me reminding him of the old Latin phrase, 'Palmam qui meruit ferat.' While writing upon this subject I may mention that I have lately introduced a new idea in connection with outside ventilating traps of drains or soil pipes, etc. In this case two defects are remedied in a very simple manner, viz., the stoppage of the ventilation when the grating is covered with snow, and a blow out from the drain of foul air by the passage of wind across the ventilating grating. The same cure that serves for the one fault serves for the other, viz., the insertion of a small pipe carried up about eighteen inches or two feet from the surface of the ground, as shown in the accompanying sketch; where A is the small pipe referred to, which admits air when the grating is closed up; or when the grating is open, instead of the wind passing across the grating sucking air down the soil-pipe, it sucks fresh air from the small pipe A owing to its being nearest the opening. This, which I consider the latest improvement in the ventilation of house drains, was lately patented by me, partly as an official memorandum and to secure the free use of my own inventions. It is already applied at the residence of various gentlemen, including Dr. Fergus.



Dr. Buchanan's sketch.



In another part of his address, Dr. Hill, in speaking of the kitchen sink, says it is protected by a non-removable bell-trap, and it would be an advantage to further protect it by a siphon bend.' Now I see no use for the bell-trap whatever; the proper plan is to have a siphon bend attached close to the sink, right under the grating, and the water to discharge outside either over or into another siphon bend with ventilating grating. As a whole, Dr. Hill's address was a most able one, and is likely to bear good fruit. In fact, none stand higher in the apostleship of social progress in the nineteenth century than our medical officers of health—they point the way and apply the spur where it is much needed.

W. P. BUCHAN.

124A, Renfield Street, Glasgow.

BATHING AT DIEPPE.

(*To the Editor of the* SANITARY RECORD.)

'O wad some pow'r the giftie gie us
To see oursels as others see us!'

SIR,—Towards the end of the bathing season I was induced to visit Dieppe with my family, the *bains mixtes* of that place offering advantages for bathing *en famille* and teaching my daughters to swim, unattainable in this country.

We found Dieppe very full, and, in ignorance of local sanitary geography, engaged rooms at a tourists' hotel on the quay; as the harbour is the great sewer of the town we suffered at each ebb a dread purgatory of horrible smells. Our host, however, assuring us in reply to our complaints on the subject, that, we laboured under a delusion, there were in fact no bad odours, what we objected to was 'the smell of the waves of the sea.'

Changing quarters to an hotel on the 'place' with pure air, excellent cooking, and comparatively moderate charges, we proceed to contemplate the mode of dipping in front of the 'établissement.'

We note firstly, that the jolting abominations called 'bathing-machines' in England, are altogether absent. Along a shingly beach, abruptly deepening like that at Brighton, are ranged a row of framed canvas bathing-boxes or *cabanes*. Those on the extreme right and left of the line, for males and females respectively, being styled *petits bains*, and charged at reduced or second-class rates. Those in the centre, identical in make, are styled *grands bains*, limited to subscribers to the casino establishment, and charged at higher rates. They are divided into three groups, for gentlemen on the right, ladies on the left, and family parties, *bains mixtes*, in the centre.

During the bathing a crowd of spectators line the parapet of the 'établissement' and the beach, conversing freely with their friends in the water. All bathers wear the regulation costumes, that for ladies being ample and becoming if well made, but the gentlemen's 'Union' looking quaint, not to say queer, on the obese figures of some middle-aged bathers.

We observe that out of several score in the water, there are four ladies who can float, one only can swim, 'slowly and indifferently,' as we opine, 'excellently well,' as her compatriots assert. Of the gentlemen none swim well, according to English ideas of the art; five are performing with a redundancy of arm-waving and very little progression, within easy reach of the shore, while now and then a portly 'Mossoo' of some forty to fifty summers, his 'form divine' arrayed in the limp, loose but skimp suit of coloured stripes, places his hand with a lamb-like trustfulness in that of a *guide baigneur*, who leads him knee-deep into the water, and there, 'O, ye whales and little fishes,' he dances ponderously up and down until he is led back to his *cabane*. Groups of four and five share the dangers of this performance hand in hand. Suddenly a Mossoo, who has ventured up to his arm-pits in the sea, is fired with a desire for distinction, he forces his head under the waters, he is lost to the sight of his friends for several seconds, he emerges again spluttering but radiant, for he holds aloft to the admiration of all, a handful of shingle, which shows he has reached quite to the bottom. I note and reprove a tendency to giggle on the part of my two boys. 'Strangers should respect the customs of the country,'

I observe. Sights so familiar to the *habitués* of the beach are gazed at with solemn approval, but soon appears something truly ridiculous. I emerge, dressed in the costume *de rigueur*, but also wearing 'swimming plates,' and followed by my sons, aged eleven and thirteen, similarly equipped; shrieks of laughter from the Mossoos greet our appearance; some are convulsed, and roll about on their chairs. Amid other comments I learn that I design to walk on the surface of the water, with those flat *palettes*. 'He is Englishman,' cries one; 'He is foolishman,' cries another. One of my boys trips on a stone and falls. Fresh shrieks of laughter from the representatives of the politest nation on earth. As, however, my sons are excellent plate swimmers, we start together, swimming a racing stroke along shore, and then straight out to sea. We learn on our return that our critics were quite as profuse in their praise as they had been in their merriment, crying out as if surprised, 'Mais ils nagent parfaitement,' and 'C'est magnifique!' till we were out of sight and hearing.

On the following day we have half a gale from the west; we find the bathing flag has been hauled down, and that entering the water is strictly prohibited. We are allowed to bathe after a little delay. No Frenchmen are in the water, and my entering is looked on as a vagary natural to an Englishman; but when Arthur, aged 11, prepares to face waves twice his own height, the ladies look alarmed, while the 'guides baigneurs' 'maitre nagueurs,' etc. collect in a group, as they afterwards confess, fully expecting to have the duty of pulling him out. We start together going nearly straight out to sea, a strong tide running along shore, a good deal of surf and recoil on the beach, and white crested waves outside as far as we can see. A very novel sensation it is flying over waves with a single blow of hand or foot plate, as if taking ten-bar gates in hunting. On Arthur's return, he is astonished at the warmth of his reception; he is surprised to learn that in the opinion of the French ladies, he has been heroically risking his life, that his swimming is at once wonderful and charming. He has never heard of heroism in what 'lots of the fellows at our school' could do, but with great presence of mind, he suits his walk to the importance of his position, and accepts the compliments paid to him graciously; so quickly can *bonnes fortunes* and flattery deteriorate natural modesty.

We found the marine promenades and reunions very agreeable, one of my little girls learning to swim well under the tuition of her brothers and myself. The French system is surely preferable to the English plan, under which you may see at one place, ladies who though fully dressed in serge, yet deem it necessary to remain, when bathing, under the hood of the machine, while at another, gentlemen (?) enter the sea without even *caleçons*. We cannot find French seaports without foul drains and pythogenic smells, but why cannot Brighton, Eastbourne, and similar places, import the system of *bains mixtes*, universal in America as well as on the continent? KEITH LESLIE.

PURIFICATION OF WATER.

(*To the Editor of the* SANITARY RECORD.)

SIR,—In your descriptive article of the sanitary appliances at the Leamington Exhibition, you refer to the improved vertical ventilation tubes introduced by the Sanitary Engineering and Ventilation Company of London.

The large and successful introduction of these improved tubes into public and private buildings, has, I am glad to see from your remarks, enabled you to give personal testimony to their merits, which must carry great weight with it, and your description of the air-purifying arrangement must have been interesting to your readers.

In addition to these ventilation tubes, an entirely new description of water filter was also exhibited by the company, which appears to have been overlooked in your notice on the subject of water filtration, and, were it not for the interest just now felt by the public on this important subject, I would not trespass on your space to the extent I purpose doing with your kind permission.

The filters exhibited at Leamington will very soon be tested in Birmingham, in order to ascertain the chemical properties of the materials employed in them, and I am very glad to see you express an opinion that it must take months to satisfactorily test the chemical action of any filter.

It appears not to be generally known that colouring matter can easily be extracted by filtration from almost any liquid, because at Guy's Hospital, a short time ago, Major Creasy's filter was exhibited, and it appears to have caused some surprise to see decoctions of logwood, tea, coffee, etc., pass through the filter, and come out clear and uncoloured, the nature of the material which worked this miracle being professedly a secret. Now, in scientific investigation very few secrets are kept, especially in so simple a matter as extracting the colouring matter from tea, coffee, logwood, wine, and even the 'fast colours' of Judson's dyes. For instance, the coke obtained by the distillation of carbonaceous shale and certain kinds of coal will effectually (for a limited period) arrest or remove all colouring matter from such liquids as those above mentioned, and produce a clear, colourless fluid, but this action will not continue for an indefinite time. Animal charcoal also possesses to a great extent this remarkable property, but after a time loses its purifying effect. These substances, especially charcoal, are exceedingly porous, and readily absorb large quantities of oxygen (the greatest purifier in nature), but if constantly saturated and out of atmospheric contact, they soon lose their effect, and become inert, and for this reason filters, after a time, become useless, and sometimes worse than useless. Being provided with an air tube, the air passes up and down the tube, instead of through the filtering material.

Mr. Bailey Denton constructed a filter for intermittent filtration, so that intervals of time might be allowed for the aeration of the filtering medium, but the arrangement being mechanical, and consisting of levers, ball-cocks, etc., was difficult of application to portable filters. The principle, however, was correct.

The chief points to be observed in designing a filter are extreme simplicity, ready accessibility to the interior, a perfect aeration of the filtering medium, and the avoidance of organic substances for the filtering material.

The aerating filters exhibited by my company at the Leamington Sanitary Congress are constructed so as to embrace each of these important features, and a short description of which (since this is the first time they have been brought before the public) may not be uninteresting.

These filters are externally of the usual form; internally they are divided into three compartments, the lower one for filtered water, the centre one for the filtering material, and the upper one for the unfiltered water, but unlike all other filters, they have no air-tube. The plate on which the filtering material rests, and which forms the division between the lower and middle chamber, is perforated in the usual manner; but instead of being a simple, flat surface, it is formed with a small dome in the centre, and perforated on the upper part. If this plate were flat, the air in the lower chamber would become compressed by reason of the weight of water above, and the whole being in equilibrium the water would not descend, but if this plate be made higher in the centre the equilibrium is at once destroyed, and the confined air will pass upwards through the filtering material at the same time that the water is passing downwards, which continues until all the air is displaced, and the chamber filled with water.

When the water is drawn off and the filter emptied, or partially so, there being no air-tubes, the air is drawn through the filtering material, thus constantly oxygenating the porous filtering material. (In some of the public aquariums, the same water has been used for upwards of seven years, and kept pure by simple aeration.)

The upper chamber, which contains the unfiltered water, is a loose pan, with a porous carbon block forming the bottom, through which the water receives its first filtration, thence through the second medium in the centre

chamber. This pan can be removed at any time to be cleansed, or to give access to the interior. The material employed in these filters is called mineral carbon. It will be seen from this description that these filters are not only novel and scientific in construction, but that they possess all the elements of simplicity combined with efficient action, and are, therefore, deserving of some notice in your journal. HORACE CARTER, Secretary.

115, Victoria Street, Westminster, S.W.

Sanitary Inventions.

EXHIBITION OF SANITARY APPLIANCES AT LEAMINGTON.

IN our last issue attention was directed to some of the forms of filter exhibited. An apparatus which will bring the product of a spring direct from its source to the surface without the possibility of contamination by accidental leakage into the well of impure water, sewage, or surface-water fulfils some important requirements in regard to the vital question of pure water-supply; and this desideratum is found in Norton's Patent Abyssinian 'Tube-wells' (to which a prize medal has been awarded), of which a detailed description will be found in the SANITARY RECORD, No. 163, vol. vii., August 10, 1877. A striking proof of the efficiency of these wells was afforded at the Leamington Sanitary Congress. A spring was found immediately adjoining the Exhibition, which is within a few yards of the river Leam. The water in this stream is somewhat thick and turbid in appearance. A well was sunk through the bed of the river to a spring of pure water beneath, the level in the tube standing seven feet above the surface of the Leam. This proves that wells may be sunk through any kind of soil, in marshy land, and in places where ordinary wells would be useless, and that wherever a spring can be found its water may be brought to the surface without the risk of contamination.

From our notice of filters last week Spencer's Patent Magnetic Purifying Filters were omitted. They have been in use for many years, and received favourable notice from Professor Frankland, Sir Digby Wyatt, and many other eminent men.

An efficient apparatus for the purification of infected clothing, bedding, etc., is Kirton's Patent Sanitary Steam Washing Machine, exhibited by Messrs. E. P. Bastin and Co. It consists of a cast iron cylinder in which a perforated cage revolves, this is divided into compartments by perforated partitions having suitable openings for the admission of the materials to be operated upon. The compartments being nearly filled, soap, soda, and water, in sufficient quantity are introduced, the steam proof cover screwed down and the cylinder put in motion by hand or steam power. Steam is now admitted by a tube, on which the apparatus revolves. Ten or fifteen minutes suffices to complete the first stage of the operation. The dirty water can then be drawn off, and fresh water and steam introduced to thoroughly rinse the articles. The apparatus seems to us simple and effective.

A good show of mattresses for infirmary and hospital as well as for use in private establishments was made by Messrs. Chorlton and Dugdale. Of all metallic spring mattresses, these are the most economical, comfortable, and admirable in every respect from a sanitary point of view. They can be thoroughly cleaned or disinfected, and afford no harbour for vermin. The arrangement of parallel chains, interrupted by strong spiral longitudinal springs, entirely removes the inconvenience of ordinary spring mattresses, which lift up on one side if used by two persons of unequal weight, and thus cause discomfort and inconvenience to their occupants. Each spring is tested up to about five times the weight that it can be called upon to support, but duplicates are supplied at a nominal cost when required. A prize medal has been awarded.

Mr. Galbraith shows his patent portable hot-air bath, an admirable invention. The bath consists of a boiler of copper, to be used over an ordinary fire. It is fitted with a safety-valve, water-gauge, and supply tube, for the introducing of water while in use. A tube of suitable length is in connection with the bath. This is a semi-cylinder, about 2 ft. 6 in. in length, and of sufficient height to leave ample room for the patient when the apparatus is placed upon the bed. A series of tubes run from side to side of the cylinder, which is covered with flannel and has a double skin of tin. These tubes are connected with a pair of bellows for the introducing of cold air, by which the temperature of the bath is regulated. After passing through the apparatus, the steam passes by a waste pipe and escapes up the chimney; a tap is provided for drawing off the waste produced by the condensation of the steam. It is capable of being used for a variety of purposes, such as the inhalation of oxygen, the vapour of herbs, or the application of heat to any part of the body. It has been tested by Dr. J. Murdoch Brown, at the Royal Infirmary, Edinburgh, in the presence of Professor Grainger Stewart, in some cases, some of which had resisted the action of various diaphoretics.

Messrs. J. Allen and Son drew our attention to some of their outwardly simple, but withal effective, sanitary and domestic inventions. Among these are the portable Turkish hot-air bath, at very small cost, of which a description will also be found in the SANITARY RECORD for July 27, 1877. It may be used in bed, or when seated on a chair, for the application of heat to the chest or extremities. The heat, generated by a small spirit lamp, is sufficient for all purposes, and may be regulated to a nicety. A bronchitis kettle, to be placed upon a chair by the side of the patient, is a useful, compact, and economical apparatus. By the removal of the tube a hot-air bath is provided, combining two apparatus in one.

Passing from heating to lighting, we noticed Mr. Miller's 'Alpha' gas apparatus, a most useful invention, simple in construction, self-acting after a few minutes' daily attention, and affording a good light, without the nuisance and danger often attending the use of coal gas. Gasoline, a non-explosive mineral oil of ·650 specific gravity at a temperature of 60° Fahr., is the material used. The apparatus can be fixed in any convenient spot, either within or outdoors, and can be used to utilise a system of gas-pipes already in use, the only alteration required being new burners of special construction.

Mr. Sugg's 'Christiana' flat-flame governor burner gives a beautifully soft light when used in connection with shades of a beautiful white opaque glass called 'Albatrine,' which he supplies with his burners. The light obtained combines the brilliancy of gas with softness and steadiness of the colza oil lamp. An important saving of gas is effected by the use of these burners, the inventor claiming a reduction of 40 per cent. upon ordinary Argand burners, and 100 per cent. over fish-tails. All who use gas will find them worthy a trial.

Messrs. Thomas Bradford and Co. have been awarded a prize medal for their new patent 'shuttle' washing machine. A favourable notice of this most useful apparatus was given in the SANITARY RECORD for August 31, page 147. It is especially adapted for large establishments, performs its work in a satisfactory manner, requires but little attention, and may be worked by the most inexperienced person after a few minutes' instruction. For cleansing infected articles of clothing it offers the advantages of working while securely closed, preventing the escape of vapour or foul gas. Fresh water may be added, and the dirty water run off without disturbing the contents of the machine.

Messrs. B. B. Haresceugh and Co.'s excreta pail, with the inventor's patent spring lid, has received a prize medal. This receptacle is hermetically sealed by an india-rubber ring on the under side of the lid, which is locked in its place by an ingenious catch. In towns where excreta are collected, and carried for disposal in open vehicles, these

pails will be found indispensable. They are strongly made, and very durable.

Mr. John Parker's dry earth closets, which combine strength, efficiency, and durability, and have received a similar mark of appreciation on several previous occasions, have here obtained a prize medal.

Messrs. F. and C. Hancock's machine for washing and cooling butter, and for turning salt butter into fresh by the action of cold water only, would seem an apparatus described in somewhat bold and confident terms. However, without entering into any attempt at a scientific explanation of its action, we can affirm that it does perform the operation to perfection; salt and rank butter, after passing through the apparatus, loses both salt and unpleasant taste. The demonstrations of its wide field of usefulness invariably attract attention. It forms a press for extracting the juice from fruit, mashing potatoes, turnips, and other vegetables, and is, in short, a most useful and withal economical apparatus. A strong jar of white metal, holding, according to the size selected, from one to three or four quarts, has perforations about one-sixteenth of an inch in diameter through the bottom place, which is removable. A tightly fitting piston driven down by a powerful screw forms the mechanical portion of the apparatus, to which a prize medal is justly given.

Mr. John Borwell's improved washer has also received the same award. It is a novelty in this description of domestic appliance, having instead of a circular an oscillatory motion obtained with less exertion than has to be expended to keep the former kind of machine in motion. The receptacle for clothes is a square box, with a few internal rods, rounded and fixed to the sides at an angle of 45° with the length of the apparatus. Inclined boards at each end serve as 'dashers,' beating out the dirt and turning fresh portions to the most energetic action of the machine. Movement is kept uniform, and the operator assisted by two heavy fly-wheels, put in motion by a crank, making a revolution at each passage of the box from right to left, or *vice versâ*.

Finally, Mr. Harris has received a prize medal for his Economical Cooking Range, of which we can speak in terms of warm commendation from personal and practical experience of its utility and economy in use. The awards to exhibitors under the following heads are still under consideration by the referees—Ventilation, Filters, Disinfectants, Baths, Warming Apparatus by Gas, Water-closets.

Many other articles of interest were exhibited at Leamington, some of which will be noticed in early issues. In the meantime we refer our readers to the catalogue of the Exhibition, or to Dr. Lory Marsh, 20 Spring Gardens, for further information.

Notice of Meeting.

LECTURES ON HEALTH.

UNDER the direction of the Trades Guild of Learning, a course of twelve lectures on 'Life and Health' will be delivered in the Town Hall, Shoreditch, by Dr. B. W. Richardson, F.R.S. They were commenced on Monday evening last, and will be continued on subsequent Tuesdays and Fridays at 8 P.M. A large proportion of the seats will be reserved at a nominal charge, so as to bring the instruction within the reach of the poorest.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

ADAMS, Mr. John, has been appointed Surveyor to the Swinton and Pendlebury Local Board and Urban Sanitary Authority, Lancashire, vice Joughin, resigned.

ARMSTRONG, Leonard, M.R.C.S. Eng., L.S.A. Lond., has been reappointed Medical Officer of Health for the Dawlish Urban, the Wolborough Urban, and the Newton Abbot Rural Sanitary Districts, at 400*l.* per ann., for two years.

CAMERON, James Spottiswoode, M.D. Univ. Edin., M.R.C.S. Eng., has been appointed Medical Officer of Health for the Huddersfield Urban Sanitary District, and Medical Attendant to the Hospital for infectious and contagious diseases, vice Pritchett, whose appointment has expired, at 250*l.* and 70*l.* per ann.

COCKS, Cambridge Cary, M.D. Univ. St. And., M.R.C.S. Eng., L.S.A. Lond., has been reappointed Medical Officer of Health for the Ross Rural Sanitary District, at 60*l.* per ann. for three years.

DICKSON, Mr. John, having withdrawn his resignation, has been reappointed Inspector of Nuisances for the Widnes Urban Sanitary District, Lancashire, at 100*l.* per ann.

DIXON, Mr. Daniel, has been reappointed Inspector of Nuisances, for the Banbury Urban Sanitary District, at 27*l.* 10*s.* 0*d.* per ann.

DUCKINFIELD, Mr. J. H., has been appointed Surveyor, Inspector of Nuisances, and Collector to the Upholland Local Board and Urban Sanitary Authority, Lancashire, vice Waterworth, resigned, at 120*l.* per ann.

DUTTON, Mr. John, has been elected a Member of the Witney Local Board and Urban Sanitary Authority, vice Clinch, deceased.

GAULTER, Mr. Matthew Smith, has been appointed Inspector of Nuisances for the Fleetwood Port Sanitary District, at 10*l.* per ann.

GRIMBLY, Richard, M.R.C.S. Eng., L.S.A. Lond., has been reappointed Medical Officer of Health for the Banbury Urban Sanitary District, at 30*l.* per ann.

HALL, Marriott, M.R.C.S. Eng., L.S.A. Lond., has been appointed a Certifying Factory Surgeon for the Sheffield District, vice Arden, deceased.

JONES, William Davies, L.R.C.P. Edin., M.R.C.S. Eng., has been reappointed Medical Officer of Health for the Ruthin Rural Sanitary District, at 70*l.* for one year.

JOUGHIN, Mr. B. M., has been appointed an Assistant Surveyor to the Corporation and Urban Sanitary Authority of St. Helens, Lancashire.

KERSWILL, John Bedford, M.R.C.P. Edin., M.R.C.S. Eng., has been appointed Medical Officer of Health for the No. 1 Sub-District of the St. German's Rural Sanitary District, vice Robert W. R. Kerswill, M.R.C.S. Eng., L.S.A. Lond., resigned.

PORTER, John, M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the Fleetwood Port Sanitary District, at 10*l.* per ann., and reappointed Medical Officer of Health for the Fleetwood Urban Sanitary District, at 40*l.* per ann.

RIDDELL, Edward Mitford Hutton, Esq., has been appointed Treasurer to the Newark Guardians and Rural Sanitary Authority, vice Godfrey, deceased.

SMITH, William Robert, M.B., C.M. Univ. Aberd., L.R.C.P. Edin., L.R.C.S. Edin., has been appointed a Certifying Factory Surgeon for the Sheffield District, vice Arden, deceased.

SYKES, William, L.R.C.P. Edin., and L.M., M.R.C.S. Eng., has been appointed Medical Officer of Health for the Mexborough Urban Sanitary District, till June 24, 1880, at 40*l.* per ann.

VACANCIES.

BARNSLEY, CORPORATION AND URBAN SANITARY AUTHORITY OF, Yorkshire. Surveyor: 250*l.* per ann., office, etc. Application, 22nd instant, to W. H. Peacock, Town Clerk.

BILSTON URBAN SANITARY DISTRICT, Staffordshire. Medical Officer of Health.

BREDBURY LOCAL BOARD AND URBAN SANITARY AUTHORITY, Cheshire. Surveyor and Inspector of Nuisances: 65*l.* for the first year. Application, 22nd instant, to John Axon, Clerk.

CAMBRIDGE. Public Analyst.

CAMBRIDGESHIRE. Public Analyst.

GUILDFORD. Public Analyst. Application, November 2, to Ferdinand Smallpiece, Town Clerk.

HUNTINGDONSHIRE. Public Analyst.

ISLE OF ELY. Public Analyst.

KIRKLEATHAM URBAN SANITARY DISTRICT, Yorkshire. Medical Officer of Health: 20*l.* per ann. Application, 26th instant, to M. B. Dodds, Clerk to the Authority.

LONG EATON LOCAL BOARD AND URBAN SANITARY AUTHORITY, Derbyshire. Surveyor and Inspector of Nuisances. Application, 20th instant, to John Black, Clerk, Nottingham.

MANCHESTER, CITY OF, AND URBAN SANITARY AUTHORITY. District Surveyor. Application, 20th instant, to Sir Joseph Heron, Town Clerk.

WHITBY LOCAL BOARD AND URBAN SANITARY AUTHORITY. Surveyor. Application, November 1, to R. E. Pannett, Clerk.

WESTBURY ON SEVERN URBAN SANITARY DISTRICT. Inspector of Nuisances: 25*l.* for one year. Application, Nov. 6, to M. F. Carter, Clerk to the Authority.

NOTICE.

THE SANITARY RECORD *is published every Friday morning, and may be ordered direct from the Publishers. Annual Subscription, 17s. 4d.; free by post, 19s. 6d.*

Reading Covers to hold 12 *numbers of* THE SANITARY RECORD *have been prepared, and may be had direct from the Publishers or through any Bookseller, price* 3*s.*

Original Papers.

ON THE WATER-SUPPLY OF SEASIDE WATERING-PLACES.

BY G. W. WIGNER, F.C.S.

(*Continued from p.* 247.)

BEFORE completing my reports on the Welsh towns, I must pause here to remark that I have ascertained that the sample of water which I received from Mr. Wynter, chemist and druggist, of Seaford, although obtained from a well—his own well, in fact—was filtered by him before he sent it to me, with which fact he omitted to acquaint me, notwithstanding that he had previously informed me that the water from the wells in the town was not filtered in any way. It will be remembered that I condemned the water, filtered though it appears to have been, but I am now making another investigation, and shall report the results next week.

The accuracy of the information given me by Mr. Hobbs, the surveyor, with reference to the supply at Newhaven, has been called in question. I am therefore making a fresh investigation into that supply, and shall report the results of that also next week.

BARMOUTH has a population of some 1,200, with about 2,000 visitors during the season. It has a constant supply, which is always available in case of fire, and is derived from a well in a rock mountain at a short distance from the town; it is said the rainfall makes no difference whatever in the supply. The quantity supplied is supposed to amount to about 20 gallons per head per day; there is no artificial filtration, as the natural filtration through the rock is supposed to be sufficient. The supply has previously been reported upon favourably by other analysts. My sample was drawn from the mains on Sept. 3, and the results were as follows :—

	Grains per gallon.
Total solid matter	5·20
Loss on ignition after deducting combined carbonic acid	1·20
Lead and copper—none.	
Iron—heavy traces.	
Chlorine calculated as chloride of sodium	2·11
Hardness before boiling, 1·1° (Clark's scale)	
,, after boiling, 1·1° ,, ,,	
Nitrogen as ammonia	0·0022
,, albuminoid ammonia	0·0028
,, nitrates	0·0280
,, nitrites	traces
Total nitrogen in these four forms	0·0330
Oxygen absorbed by organic matter	0·0400

The sample had a good pale-blue colour, and was quite free from suspended matter, showing that the natural filtration was sufficient. It had neither taste nor smell. The microscopical appearance, however, was not so good as might have been expected from the other results. The residue left by a drop of the water evaporated on a slide always showed a dark yellow-tinted margin, but no animalculæ or recognisable organic remains were visible. It is most probable that the yellow tint is due to the presence of iron. In all other respects the water is a good one.

ABERYSTWYTH has a population of about 7,000, and during the season probably as many visitors. It is said to be supplied with water obtained from Llanbadarn Wells, and that the supply is intermittent; it is also said that most of the inhabitants filter the water before using it. My sample was drawn by my assistant from the main on September 4, and was unfiltered. The results were as follows :

	Grains per gallon.
Total solid matter	10·60
Loss on ignition after deducting combined carbonic acid	3·80
Lead and copper—none.	
Iron—slight trace.	
Chlorine calculated as chloride of sodium	2·45
Hardness before boiling, 3·0° (Clark's scale)	
,, after boiling, 3·0° ,, ,,	
Nitrogen as ammonia	0·0050
,, albuminoid ammonia	0·0061
,, nitrates	0·0250
,, nitrites	0·0030
Total nitrogen in these four forms	0·0391
Oxygen absorbed by organic matter	0·1520

After this sample was drawn, and my report on it written, I was informed by the proprietor of the *Aberystwyth Observer* 'that a few days before the sample was taken some one had cut a hole in a pipe' in such a position as to allow surface water to enter the mains, and that the fault was not found out for some days. I do not know on what ground he says the hole was made before my sample was taken ; but as of course, I should be unwilling to condemn a supply which has been made impure by such an accident as this, however much the possibility of such an occurrence is to be regretted. I shall make no remarks on this sample except that it had a dirty green yellow colour, and contained traces of suspended matter, and that the microscopical examination showed that it contained much amorphous sedimentary matter, and a good deal of vegetable growth, all of which *may* be accounted for by the fact stated above.* I shall obtain another sample and report on it fully. I also had a sample of the water which had been filtered, but I need make no further remark about it, than to say that, except as regards the removal of the suspended matter, the filter was, as is too often the case, a useless one.

SALTBURN-BY-THE-SEA, on the Yorkshire coast, was missed from its proper order. I am indebted for my sample to Mr. Wm. Taylor, who says it was drawn from a main on October 3. The town is said to be supplied with a constant and unlimited supply by the Cleveland Water Company, who derive their water from a large water shed, seven miles away, on the moors, with many good springs. At present the water is not filtered, but filtering beds are said to be in course of construction, and are expected to be finished before Christmas. The following are the results of the analysis :

* Since the above was in type I have received a copy of the *Aberystwyth Observer* for Oct. 6, 1877, which contains a report of a meeting of the Town Council, at which a report by Dr. Frankland, who had recently analysed the water, was read. This report agreed with the opinion I had already written, but withheld, viz., that the water-supply was in a very unsatisfactory condition. Dr. Frankland's sample was received by him on Sept. 24, *i.e.* nearly three weeks after mine was drawn, and he states that it 'contains a number of animalculæ visible to the naked eye, it is on this account not suitable for dietetic purposes without previous filtration,' and 'even after filtration it would be a water of low quality, though not decidedly unwholesome.' In the same newspaper, it is state d that a Mr. James 'poked his stick through the pipe on Thursday in last week,' which would be Sept. 27, my sample having been drawn, as appears above, on Sept. 4.

	Grains per gallon.
Total solid matter	10·30
Loss on ignition after deducting combined carbonic acid	6·00
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	2·223
Hardness before boiling, 3·8° (Clark's scale)	
,, after boiling, 3·8° ,, ,,	
Nitrogen as ammonia	0·0016
,, albuminoid ammonia	0·0050
,, nitrates	traces
,, nitrites	0·0030
Total nitrogen in these four forms	0·0096
Oxygen absorbed by organic matter	0·1930

The colour was a dirty brown, and there was a very large amount of suspended matter, showing as clearly as possible the necessity for the filtering beds which are being constructed. When the suspended matter was removed, the water had a dark yellow colour, and the usual accompanying large amount of oxygen absorbed by organic matter, and when warmed it had a very offensive smell and taste. The microscopical examination gave extremely unsatisfactory results, several specimens of volvox and other forms of living animalculæ were present, and in fact although the water shows but little ammonia and nitrogenous compounds, and is practically entirely free from nitrates, the colour, smell, taste, oxygen absorbed, and microscopical appearance are such that it must be condemned in its present condition as a very undesirable drinking water. I shall hope to have another sample when the filtering beds are finished.

ST. ANNE'S-BY-THE-SEA, on the Lancashire coast, was also missed from its proper order. According to the last census it has a population of about 1,000, and it is one of the most rapidly-growing watering places in the North. The water is said to be supplied by the same company who supply Blackpool and Lytham. At present there is not a constant supply. My assistant drew a sample on October 6, *i.e.* some weeks later than the Blackpool sample, and the results are as follows:

	Grains per gallon.
Total solid matter	6·70
Loss on ignition after deducting combined carbonic acid	2·00
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	1·28
Hardness before boiling, 1·4° (Clark's scale)	
Hardness after boiling, 1·4° ,, ,,	
Nitrogen as ammonia	0·0026
,, albuminoid ammonia	0·0021
,, nitrates	0·0130
,, nitrites	0·0100
Total nitrogen in these four forms	0·0277
Oxygen absorbed by organic matter	0·1408

The sample had an orange yellow colour, and when warmed, the smell was flat and the taste unpleasant, and may perhaps be best described as peaty. The microscopical examination showed traces of vegetable contamination, but no animal impurities of any kind. A comparison of the results with those which I obtained from the Blackpool and Lytham waters will show that there is a very fair degree of accordance between them, and that possibly they are derived from the same source. The most objectionable feature in the water is unquestionably the very large proportion of oxygen absorbed, and in this respect it quite accords with the two samples from Blackpool and Lytham, but it differs from them in that it does not show any living organisms, and from the Lytham supply in that it has no suspended matter. The albuminoid ammonia is also much lower than in either of those two waters. It cannot, however, be classed higher than as a second-class water.

In my next paper I shall, as I have said above, refer to the Newhaven and Seaford supplies, and then give a summary as to the northern watering places, similar to that which I gave as to the south-eastern ones, including, if time allows, the watering places of the Isle of Man.

(*To be continued.*)

THE OUTBREAK OF TYPHOID FEVER AT BAXENDEN AND ACCRINGTON CONSIDERED IN CONNECTION WITH THE WATER-SUPPLY.

BY G. W. WIGNER, F.C.S.

TYPHOID FEVER having broken out seriously at Baxenden, and one or two isolated cases having occurred in the adjoining place, Accrington, I was instructed by the Editor of the SANITARY RECORD to investigate the character of the water-supply. Accordingly on October 6 I sent an assistant to those places, and he obtained samples of the water from half-a-dozen houses in the infected districts. Accrington appears to be supplied from two different sources—the west end from the Lodge at Great Howard; of this supply I had one sample. The east end of the town is supplied from reservoirs at Burnley Road; of this supply I had two samples. Baxenden, which has a population of about 1,500, is supplied from Mitchell's reservoir, and the supply is said to be constant, although I am informed it has had to be cut off several times recently, to enable repairs to be executed. It has been reported that this supply comes from a coal-pit, but the medical officer of health contradicts this statement. The supply is not filtered.

My sample from the west end of Accrington was drawn from a house in Blackburn Road, where the only recent *fatal* case of typhoid fever in that town occurred. The results of my analysis of this sample are as follows:

	Grains per gallon.
Total solid matter	10·30
Loss on ignition after deducting combined carbonic acid	2·70
Lead and copper—none.	
Iron—slight trace.	
Chlorine calculated as chloride of sodium	1·28
Hardness before boiling, 4·4° (Clark's scale)	
,, after boiling, 4·4° ,, ,,	
Nitrogen as ammonia	0·0021
,, albuminoid ammonia	0·0100
,, nitrates	0·0300
,, nitrites	0·0050
Total nitrogen in these four forms	0·0471
Oxygen absorbed by organic matter	0·1380

The water was free from suspended matter, but had a strongly-marked greenish-yellow colour, and when warmed a very offensive smell. I preferred not to taste it; I examined it very carefully by the microscope, but the dried residue did not show any traces of urinary salts. I found one single hair of small

size, and a few fragments of torn cotton fibres in one or two places, but no animal remains or living organisms. In this case, therefore, the microscope throws very little light on the subject. As to the chemical results the albuminoid ammonia is high, just on the margin line of third-class water; the nitrates are low enough to pass; the loss on ignition bears a very high ratio to the total solids; the oxygen absorbed is excessively heavy, and this is associated, as is almost always the case in such waters with the suggestive yellow colour. To sum up the whole, it must be considered as a third-class water.

Of the two samples from the east end of Accrington, one was from a house in the Manchester Road, and the other from a house in Abbey Street, both of which houses are supposed to be supplied from Burnley Road reservoir; but a comparison of the figures of the analyses shows that in some respects the samples differ considerably in their composition, and it is worthy of remark, in reference to the second sample, that there have been complaints for some time past from the residents in the house of the water being bad, and having a fishy taste and smell. The results are as follows:

	Manchester Road. Grains per gallon.	Abbey Street. Grains per gallon.
Total solid matter	8·30	8·50
Loss on ignition after deducting combined carbonic acid	2·00	2·10
Lead and copper	none	none
Iron	none	slight trace
Chlorine, calculated as chloride of sodium	1·23	1·28
Hardness before boiling, Manchester Road, 3·7°; Abbey Street, 3·7° (Clark's scale)		
Hardness after boiling, Manchester Road, 3·7°; Abbey Street, 3·7° (Clark's scale)		
Nitrogen as ammonia	0·0015	0·0037
,, albuminoid ammonia	0·0052	0·0101
,, nitrates	0·0300	0·0690
,, nitrites	0·0050	0·0040
Total nitrogen in these four forms	0·0417	0·0868
Oxygen absorbed by organic matter	0·0980	0·0760

The Manchester Road sample had a pale yellow colour, with only very slight traces of suspended matter; when warmed the smell was slightly offensive. The microscopical examination showed that the suspended matter consisted mainly of amorphous earthy particles. There was very little vegetable tissue present, and no animalculæ of any kind or animal remains.

The Abbey Street sample had a large quantity of suspended matter—enough to render the water quite cloudy; the colour was a dirty opaque yellow—had it not been for the suspended matter the colour would probably have been a pale yellow; when warmed the water had a decidedly offensive smell. The microscopical examination showed much amorphous suspended matter and a few fragments of vegetable tissue; much larger, however, in quantity than in the Manchester Road sample; it also showed a few bacteria.

It is desirable specially to note the points in which these samples differ, as it is extremely difficult to account for such variations. The free ammonia, albuminoid ammonia, and nitrates in the second sample are all double the corresponding figures in the first one, while the nitrites show a difference so small as to be scarcely reliable. On the other hand, the oxygen absorbed is about one-fourth less. Then again the second sample shows a great increase in the suspended matter, and bacteria are present in this, but not in the first sample. The second, or Abbey Street sample, is clearly the worst of these two waters, but it is more difficult to say whether it is worse than the west end or Blackburn Road sample. As regards albuminoid ammonia it is practically identical with the last-mentioned one; the nitrates are heavier and the oxygen absorbed is much less, so that apparently the Blackburn Road water must have been better oxidised. These are certainly not satisfactory waters.

At BAXENDEN my assistant obtained three samples, all from houses in the Manchester Road. I will refer first to two samples, each of which was taken from a house in which a child was then suffering from typhoid fever. The results are as follows:

	No. 1. Grains per gallon.	No. 2. Grains per gallon.
Total solid matter	9·31	7·70
Loss on ignition after deducting combined carbonic acid	5·11	4·9
Lead and copper—none.		
Iron—slight traces.		
Chlorine calculated as chloride of sodium	1·05	1·11
Hardness before boiling, No. 1, 2·3°; No. 2, 2·3° (Clark's scale)		
Hardness after boiling, No. 1, 2·3°; No. 2, 2·3° (Clark's scale)		
Nitrogen as ammonia	0·0022	0·0019
,, albuminoid ammonia	0·0050	0·0108
,, nitrates	0·0620	0·0640
,, nitrites	0·0100	0·0090
Total nitrogen in these four forms	0·0792	0·0857
Oxygen absorbed by organic matter	0·1674	0·1928

Both samples had a dark urine yellow colour. No. 2 had in addition heavy traces of suspended matter; the smell of No. 2 was offensive when warmed, while that of No. 1 was unmistakably suggestive of fæcal matter. The microscopical appearances were practically identical; no animalculæ or animal remains could be recognised in either. The third sample was taken from a house in which a man—I believe the father of the family—was then ill with typhoid fever. The results are as follows:

	Grains per gallon.
Total solid matter	10·70
Loss on ignition after deducting combined carbonic acid	4·41
Lead and copper—none.	
Iron—slight trace.	
Chlorine calculated as chloride of sodium	1·05
Hardness before boiling, 2·3° (Clark's scale)	
,, after boiling, 2·3° ,, ,,	
Nitrogen as ammonia	0·0022
,, albuminoid ammonia	0·0059
,, nitrates	0·0640
,, nitrites	0·0090
Total nitrogen in these four forms	0·0811
Oxygen absorbed by organic matter	0·2110

This sample also had a full urine colour, and a smell quite as offensive and suggestive as No. 1. In all these cases I have preferred to omit the taste. The microscopical examination of this sample showed a marked difference from Nos. 1 and 2; the residue of a drop carefully dried showed some well-marked crystals of urate of ammonia, and the slide was full of minute but yet quite distinct fragments of organic remains of different kinds. In general appearance

it was worse than an ordinary sample of precipitated sewage.

These three samples from Baxenden, therefore—bearing in mind that they were all obtained from the same place and from what is supposed to be the same supply—present some remarkable and almost unaccountable differences—such differences, in fact, as to render it quite intelligible that a few days ago the supply was 'like unto liquid mud.' In my opinion this liquid mud must have deposited a sediment in the pipes, which is being carried forward at different rates according to the amount of draught on the pipes or other local circumstances.

Considering these three analyses together and in a general light, I find that one sample is excessively high in albuminoid ammonia, and the other two are moderate; all three show an excessive loss on ignition, with no large proportion of nitrates to account for it; all three show an excessive amount of oxygen absorbed, and, as usual in such cases, the corresponding yellow colour; one has an offensive smell, and the other two the most offensive of all smells that a drinking water can have, and in one case the microscopical results alone are enough to condemn the water. Putting all these facts together, the Baxenden water must certainly be pronounced as worse than that of Accrington.

Considering all the figures of the analyses, the microscopical examinations, and the statements in the report of the medical officer of health, there certainly, in my opinion, appears to be a strong probability that the impure water-supply has been the cause of this outbreak at Baxenden. By this I do not mean that I have succeeded in detecting microscopically any typhoid germs, or even that I consider the detection of them would be possible under ordinary circumstances, but I am convinced that if a sample of water shows the ordinary chemical and microscopical signs of animal contamination, and typhoid fever has occurred where this water is used, it is highly probable that the water is in some way the cause of the outbreak.

METROPOLITAN PURE SEA-WATER SUPPLY.

II.

THIS undertaking is one of gigantic proportions, and must be considered in its various aspects very attentively and studiously before any really just conclusions respecting it can be arrived at with certainty. There can be no question as to the magnitude of the undertaking producing a correspondingly great beneficial result, assuming that all the proposed supply will be readily taken up by private dwellings, hotels, public baths, hospitals, and aquariums, and this depends in a great measure upon the rates at which the supply can be delivered to each and all of these being economical.

The principal works consist of the inlet, tunnel, and well, duplicate powerful pumping engines, with house, etc.; three miles of duplicate 24-inch main to standpipe, 500 feet above the sea, fifty-six miles of large mains to London, with a reservoir situated about twenty-five miles from London, capable of containing 30,000,000 gallons; 130 miles of smaller mains, with about 400 miles of service pipes between 6 inches and 2 inches diameter, exclusive of minor services for each separate household supply. Dwelling-houses and offices in connection with the works would also be required at Lancing, Dorking, and London. Preliminary estimates, carefully prepared, indicate that all these requisites can be provided and put into working order for about one million and a half sterling. From Lancing to London there will be no more than the usual trouble in laying the mains along the side of the turnpike-roads and providing for a supply at any locality where it may be demanded along the chosen route. But when the London suburbs are reached the real difficulties begin. There are so many pipes, gas and water, already occupying the main roads that barely room will be found for so large a main as 26 inches, and no doubt a considerable amount of trouble will be caused in overcoming constantly recurring difficulties in position and direction owing to existing pipes. After fairly getting into Clapham the proper crossing of the Thames will be a matter for serious consideration, as if it can be accomplished on any of the existing road or railway bridges it will effect an enormous saving in original outlay. It must be borne in mind that the weight per foot run of the main with water will be no more than 5¼ cwt., and that such a dead load will be a hardly perceptible addition to the permanent load of any of these structures. This is a most important consideration, and one which will carry considerable weight in the interests of the eventual prosperity of the undertaking in a financial point of view. Having fairly entered the West-end of London, the real difficulties with existing mains and right of way would have to be encountered, and no doubt a considerable amount of skill would have to be displayed in overcoming them without laying down any portion of the mains in such a manner as to seriously retard the flow of water. In many places it would be found almost impossible to avoid serious inconveniences of this kind, permanently affecting the supply, but close preliminary investigation and engineering skill would doubtless overcome them all to a very great extent, leaving the calculated daily supply untouched, especially as the mains are larger than requisite, allowance for contingencies being taken into account in the calculations.

The distribution through London and in the country will not interfere with existing mains' privileges to any great extent, and can be accomplished, it is anticipated, just as economically as the ordinary water-supply has proved to be generally speaking. Every house or establishment would have a water-meter, the supply being regulated according to the tenant's pleasure by a valve in the ordinary way, and the amount of water used would be paid for quarterly, at so much per thousand gallons registered, 2*s.* 6*d.* being probably the lowest rate charged for that quantity. The price of pure sea-water now in London is about 3*d.* per gallon, or at the rate of from 10*l.* to 12*l.* per thousand gallons, and it can readily be understood that not very much of it has found a sale at that rate, which is not too exorbitant, when it is remembered that the cost of obtaining it and transporting it by rail is very great. The London Aquarium may become an aquarium indeed, with abundance of pure sea-water, at a very low instead of a very high rate, and the constant flow of pure water will keep the various kinds of fish exhibited in a livelier and healthier condition. The charge for the supply being at so much per thousand gallons to all classes of the community, no objection would be taken to those unable to afford the

annual cost of the supply laid on in their houses purchasing from whoever was willing to sell them any required quantity, and no doubt a small trade in sea-water would spring up all over London, as in any other commodity, thus still further distributing the supply among the poorer classes. A cask containing 100 gallons could be purchased for 4½*d.*, leaving a handsome profit to the vendor. A family using 100 gallons daily throughout the year—and as a rule that would provide a good many separate small baths—would be charged at the rate of about 4*l.* 10*s.*, and 6*s.* rent for the meter, which, remembering the certain beneficial effects of sea-water bathing, may be considered very economical, and within the reach of all 40*l.* householders in London and the country adjoining. Taking into consideration that all public and private baths are certain to take the pure sea-water, it may safely be considered to be put within the reach of the poorest in the community, including even the workhouse inmates. Its universal distribution will be certain, and the general effects on the health of London quite unmistakable within a period of a year or two after the regular supply would have commenced. No one who can afford it will refuse the pure sea-water supply, when it can be so readily laid on, and can always be relied upon, night and day, all the year round.

In addition to London it is proposed to include every place of any importance on the route, as being fairly within the limits of the distribution, on the same terms as are proposed for London. The head of 500 feet gives a command over a considerable portion of Sussex, Surrey, and Middlesex, including many important towns and residences not more than 300 feet above the sea. It may be safely stated that all of those towns which are far too numerous to mention would gladly welcome the pure sea-water supply, and willingly take their share of it at the reasonable charge propounded. Some of them are close along the route, and could be accommodated readily and economically; others are too far away for an economical supply, and perhaps there might not be sufficient water to spare. Taking into account the great population of London and its suburbs, and the comparatively thickly inhabited country along the route of the mains, a total quantity of 7,000,000 gallons would, it is calculated, be readily taken up daily, distributed over a length of about sixty miles of mains from the sea to the East-end of London. This large quantity of sea-water would never fail throughout the year, and its health-giving properties would, therefore, be unremitting, and a marked change for the better would be observable in the people inhabiting the country and towns along the route of the mains. The presence of the pure sea-water would certainly encourage more frequent bathing.

It has been stated that all these advantages can be secured for a capital outlay of about 1,500,000*l.* sterling at the outside; and supposing that even 1,000,000 only out of the population of 4,000,000 nearly put within the reach of the supply were to benefit directly through it, can it be doubted for a moment that to embark on the outlay of so great an amount of money would be a most desirable and advantageous undertaking? Prove that this route is the best for the introduction of pure sea-water in the specified quantity; that you can sell it to advantage for about 2*s.* 6*d.* per 1,000 gallons; and that the necessary works for so great a total supply can be completed for about one million and a half sterling, and it may justly be stated that philanthropists and capitalists will readily come forward to support the project to a successful issue, seeing that a vast improvement in the health of so great a multitude of people would be effected by it. London and its suburbs require every aid that can be afforded to sustain and maintain and, if possible, improve its present comparatively healthy state, and it may without prejudice be stated that, after a pure fresh-water supply, a pure sea-water supply would be the next desideratum, and materially increase the healthy condition of its inhabitants generally at a very moderate outlay. The discharge into the open air of so great a quantity of pure sea-water daily would liberate a very great amount of health-giving odours under pressure into our atmosphere, of which all the inhabitants would feel the benefit more or less. The pleasant salt smell would be in every house having the supply laid on, rendering the atmosphere purer and healthier.

S. M. B.

THE

SANITARY RECORD.

FRIDAY, OCTOBER 26, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

TYPHOID FEVER IN LANCASHIRE.

THE outbreak of typhoid fever at Baxenden and Accrington which has just been reported by Dr. Booth, the medical officer of health for the districts, forms a good practical commentary on the paper which Mr. Brudenell-Carter read before the Sanitary Institute Congress at Leamington, and which we published in the SANITARY RECORD for Oct. 12, p. 238. From 60,000 to 100,000 lives lost every year by communicable, and therefore preventable, diseases form indeed a fearful sacrifice to the demon of filth. Unfortunately these outbreaks generally occur in districts where the parsimony of the local authorities compels a medical man in full practice, and consequently with little spare time, to add the duties of medical officer of health to his ordinary functions for a paltry pittance of perhaps 20*l.* a year. Under such circumstances it would be too much to expect that a proper and satisfactory investigation could be made into the causes of the outbreak, unless the central sanitary authority interfere. To carry such an investigation as is needed to a satisfactory issue requires not only special knowledge and special training, but an expenditure of time and an amount of patient inquiry which cannot be expected from officers who are already underpaid for the work they must necessarily do. Yet the statis-

tics which Mr. Brudenell-Carter puts forward, show clearly that even if such inquiries were ten times as expensive and tenfold as troublesome as they are, the money gain alone by the gradual separation and stamping-out of zymotic diseases would leave the country a net gainer in the end; and if we add to this the tens of thousands of valuable lives which would be saved—sometimes the life of the bread-winner of the family, whose premature death drives the widow and children to poverty; in other cases the mother, whose death leaves the neglected children to grow up mismanaged, to want and ruin—we have indeed a terrible picture, showing how much England might be, in a sanitary sense, improved.

In the special case to which we are referring Dr. Booth certainly seems to have done all in his power, but he appears to have to deal with a board of the usual type of rural sanitary boards—composed of men who would let disease flourish in their midst rather than spend money in the sanitary improvements which their trained officers tell them are necessary. In this very report he complains of certain recommendations of his not being carried out, but does not say what they were; we may, however, form some opinion on this point from the state of things he describes in the following paragraph: 'The drains from many of the houses open into the fields at the back, where water collects and forms a stinking seething pool. The abominable open ashpit also exists close to the back door of nearly every house, giving forth its deadly gases from the decomposing animal and vegetable filth.' Yet this condition of things is, according to Dr. Booth's report, 'neither better nor worse' than that existing at most of the houses in Baxenden. We cannot wonder that typhoid fever finds a congenial home here.

Dr. Booth has examined the milk supply; but from the fact that the people in each of the infected houses are supplied by a different milkman, he comes to the conclusion that the milk has nothing to do with the outbreak. It would not be right or just to expect a medical man to fully analyse a varying water-supply such as he says there is here, but the results which he found were unsatisfactory enough. He describes one sample as 'like unto liquid mud,' and says that complaints have frequently been made as to the smell and taste of the water. We find from the local paper that the report was read to the board—they talked about it, and—adjourned; we have since heard that they have again met, and again adjourned! without doing anything.

We, however, felt that such a case ought not to be allowed to pass entirely unnoticed, and we therefore requested Mr. Wigner to procure samples of the water immediately and report on them, and we publish his report in this number. It must not, however, be supposed that we think this report all that is necessary. We have done our duty to the public fearlessly in exposing the contaminated condition of the water-supply; the local authorities must now do theirs and search for the source from whence the contamination arises.

Special Reports.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.

THE first meeting of this session was held on the 19th inst., Dr. Stevenson, president, in the chair. After the minutes had been read, Mr. Liddle rose to move that the following subjects be referred to the council, viz., as to the best or most practicable method of obtaining returns of infectious diseases, and also of procuring alterations in the Metropolitan Building Act, so as to prevent houses being built in such a way as to be injurious to health. Dr. Tripe seconded, and reminded the meeting of the steps that had already been taken by the society in these matters. Mr. Michael (barrister) considered the first requisite to be a consolidation of the sanitary Acts affecting the metropolis, and which should be assimilated to those for all England, and that powers should be given to the Metropolitan Board to make by-laws, as can be done in extra metropolitan districts. Both subjects were then referred to the council for consideration and report.

Dr. Stevenson then read his introductory address, and said that during the past year some statements had been made in sanitary matters which were new, and others which were true, but that very few had been advanced which were both new and true. That in order to advance sanitary science and its power of doing good, something more must be done to remove the scepticism of the public, and to teach them the value of preventive medicine. He reminded the society that they met together for mutual instruction rather than for self support, and that it was their duty to gather together the materials they require from the chemist, physicist, and engineer. The position of the medical officer of health is frequently peculiar, as he has often to advise his board to take action opposed to their preconceived opinions or even to their individual interests, and he also had frequently to encounter the opposition, or at least the want of recognition by many members of the medical profession who had not been taught during their medical studies the principles of preventive medicine. He then referred to the charge so often made of the slothfulness of many local sanitary authorities, and expressed his belief that this arose rather from want of knowledge than want of will, and that great advances had been made during the last two or three years, not only as regards the public, but the medical profession. He advised that this should be assisted by stirring up public opinion by lectures and writings, but especially by means of the press. He considered that the introductory addresses given this year at the medical schools, the inaugural address delivered and papers read at several of the scientific meetings, and the courses of lectures now arranged for at some of the medical schools, were very encouraging, as showing the tendency towards a full and fair discussion of many of the most important subjects in state medicine. He however regretted that the lectures were generally so few, and attendance on them voluntary. Another encouraging sign was the interest taken in the subject by ladies, who were the first to suffer whenever disease arose from neglect of proper sanitary precautions. He considered that vestries and district boards are now much more alive to the importance of the duties they have to carry out, and are much more ready to fulfil them, especially as regards the steps necessary for the spread of infectious diseases, and referred especially to his own district, St. Pancras, and Bolton. At the latter place the corporation require the occupier of the house or the person in charge of

the sick to give notice at the Town-hall of every case of infectious disease, and every medical practitioner to forward a certificate, paying a fee of 2*s*. 6*d*. for the same, the penalty for neglect in either case being 10*l*. He feared such a system could not be carried out in the metropolis at present, in consequence of the opposition of the public, who considered every man's house to be his castle, and of the medical practitioners, many of whom believe that the giving of such a certificate would be a breach of confidence. But it should be considered how far such a notice would conduce to the public benefit rather than anything else, and the danger to the community of suppressing the necessary information should also be fairly weighed. If it be conceded that the information is necessary as regards infectious diseases, we might go further and discuss the value of a return of every case of sickness, which would furnish a check against such cases as that of the Stauntons. He then touched on the probability of efficient sanitary legislation during next session, and said that the Society might be called upon to express its opinions as to the necessity for a central sanitary authority, having more power than the Local Government Board at present possesses, and the relations of medical officers to that authority, and pointed out that local sanitary authorities generally chafe at restraint and are, in the metropolis at any rate, more ready to advance willingly than by compulsion. He considered that for many reasons the Local Government Board would not be satisfactory as a central controlling authority either to local authorities or medical officers, especially as its chief functions are to superintend the carrying out of the poor law work, and concluded by noticing the relations between milk and typhoid fever, the cattle-plague and state of the cowsheds, and the incorporation of the business of a cowkeeper by the Metropolitan Board of Works amongst offensive businesses. Dr. Tripe proposed a vote of thanks to the President for his practical paper, and expressed his opinion that if compulsory registration of infectious diseases should be enforced in the metropolis, the necessity of giving information should be laid equally on the person in charge of the sick and the medical attendant. Also that there should not be a divided jurisdiction for the removal of infected persons as there is at present. Mr. Liddle would not in any way discuss the address, and simply seconded the vote of thanks, which was carried unanimously. Mr. Michel, on being called upon, expressed his satisfaction at the practical character of the address, and said the feeling that every man's house is his castle is often injurious, as the public interest should be paramount. He objected to the Local Government Board acting as the central authority for sanitary work, and thought there should be a Minister of Public Health; that the present divisions of sanitary districts into urban and rural should be obliterated, that there should be one board for all purposes of local self-government for a large division, say a county; and that medical officers of health should be restricted from practising medicine as one great cause of jealousy amongst the medical profession would thus be removed. Dr. Stevenson then returned thanks, and the meeting adjourned.

PAPERS READ AT THE CONGRESS OF THE SANITARY INSTITUTE OF GREAT BRITAIN.

(*Continued from page* 254.)

DR. GEORGE WILSON, M.A., medical officer of health for Mid-Warwickshire, read a paper entitled 'The Past History and Future Prospects of Sanitary Science.' The lecturer gave a description of the 'insanitary' mode of living of our forefathers, and dwelt upon the results in the dreadful diseases which afflicted the nation from time to time. He traced the rise of better conditions of life, from the introduction of soap and soda, the adoption of cleanliness in person and houses, and the consequent disappearance of diseases which before were constantly raging. In conclusion, he said that the average death-rate for England and Wales had remained stationary at a little over 22 per 1,000, and there was no doubt of the possibility of lowering the general death-rate and prolonging the average duration of life. The death-rate in Lincoln had been lowered from 80 per 1,000 in the seventh century to 50 per 1,000 in the past century, and to 24 per 1,000 in the present day. Owing to improvements in drainage and water-supply, the average death-rate of the neighbouring town of Coventry had been lowered from 27 per 1,000 during the 10 years 1841 to 1851 to 21 per 1,000 during 10 years ending 1871; and many other towns, such as Salisbury, Wisbeach, Hull, and Wolverhampton, had been experiencing a steady reduction. If the death-rate of the whole country were reduced to the low average death-rate of a town like Leamington, 17 per 1,000, and such reduction was quite within the possibilities of sanitary science, then, the Registrar-General's returns proved, there would be an annual saving of 115,000 human lives in England and Wales. Surely, he urged, the hope of saving any number of these lives, and of mitigating to some extent the enormous amount of needless suffering which they represented, was enough, and more than enough, to fire the ambition of everyone who believed in human progress. The nature and extent of the work required was now known, and, he added, we can rely on the steady growth of intelligent conviction, which, proceeding from the Press and public platform, is rapidly influencing all classes of the community, and enlisting their services in the grand policy of prevention.

Mr. W. WHITE read a paper on the treatment of domestic sewage, and protested against the view, so often adopted, that the proper treatment of such sewage was with lime. He maintained that as the sewage was alkaline in its nature it required acidulation. Lime augmented the volume of matter, promoted decomposition, evolved ammonia, and intensified stench, while in the effluent it injured vegetation, poisoned fish, and aggravated corruption. He said that charcoal could be turned to good advantage. Charcoal or coke reduced to fine dust and saturated with chlor-oxide of calcium was, in conjunction with sulphate of aluminum, perhaps the most powerful combination of material for sewage purification yet devised. A paper by Mr. Baldwin Latham, C.E., on the Influence of the Movement of Subterraneous Water on Health, was read. He declared that these waters were ever in movement.

A paper by Archdeacon DENISON on the 'Supply and Storage of Water at East Brent,' was read by Dr. James Thompson. The writer said the natural advantages for supply and storage of water at East Brent were very great. The supply, however, would be nothing without the storage. Last year, during a four months' drought, he was enabled to give water not only to his parishioners, but to many others at a great distance; and when the drought was over his reservoirs were still three-parts full. He had since that time much enlarged them, and was still adding to their capacity. When he went to East Brent in 1845 there was no pure water to be had except what was held in two shallow wells near the foot of the knoll, the 'Lady Well,' or 'Well of the Virgin' (the church being dedicated to the Virgin), and the 'Dripping Well,' both of them on the foot of the knoll, at some considerable distance from the village, and of limited power of supply, though never wholly failing. The village lies on the east side of Brent Knoll, an isolated hill, about four miles round at its base, from 400 ft. to 500 ft. above the level of the Bristol Channel, from which it is two-and-a-half miles distant. The flat out of which the hill rises is bounded to the north and east by the Mendip Hills, to the south by the Poldon Hills, and runs up to Glastonbury and Wells. The knoll is full of springs, and is a natural reservoir. It also in a rainy time collects and discharges great abundance of surface water down its several water-courses. There are no houses on the hills, and the surface water is as free as may be from impurity. On the east side of the knoll the

main water-supply is by three water-courses. The middle course, which yields the largest supply, comes down opposite the vicarage, and is that from which the reservoirs have been filled. In a long drought the water in the water-course ceases, and the only supply is by a spring traced and recovered by himself in 1866. It appeared, from the great depth to which he had to go before coming to the water, that the spring had been choked for a great number of years. The spring never fails, but in a long drought its yield falls to a gallon a minute, while nine gallons a minute is the largest yield noted. The water is excellent, with a good deal of iron in it. It was the recovery of this spring which led the Archdeacon to provide for storage of water. He believed, from many indications upon which he came in excavating, that there was a pump over it long ago for the use of a mill-house standing just above the mill dam, the foundations of which, as of the wall carrying the water-wheel, he found in 1866. Records of the mill up to 1187 were found in the Glastonbury papers. The reservoirs were half made to his hand, and permission having kindly been given him by the Rev. Dr. Symons in respect to all that part lying outside the glebe, all that was required was to clear away brambles and brushwood from waste land of no value, to excavate deeper, to shape, and to build a succession of dam walls, giving out the water above each either by taps or siphons, when in a dry time there is little or no overflow. The Archdeacon hoped to be able before he was done to carry 500 yards further a supply pipe to another tank and pump at the further end of the village.

Dr. J. SINCLAIR HOLDEN, of Sudbury, Suffolk, read a paper on the 'Law of Caprice in Contagion.' He aimed, he said, at showing that investigation could unravel all the vagaries of contagion within the domain of law. Scarlet fever infection was specially instanced, as oftener charged with caprice than other diseases of this class. This was attributed to an important law of the disease being too much overlooked. While severe cases of scarlet fever had a concentration of attention, the mild cases, often the most numerous, and always the most infectious, were not hunted out and kept specially under sanitary supervision. Wherever an outbreak occurred a mild case was at the bottom of it. Where isolated cases cropped up and spread no infection, there were sure to be severe cases. The rationale given was that the mild cases shed an almost invisible poison dust from the skin, and were let loose on society during this stage; and because they were never really ill, little restraint was maintained. In severe cases the skin shed its scales less minutely. The size and weight of the scales diminished enormously the chance of their being so lavishly scattered about as in the mild cases; besides, in severe cases the patient was under more restraint. The remedy which the laws of this disease indicated was the converting of the dry scaly dust into a moist controllable form, by frequent rubbing of the whole body, as soon as the faintest rash appeared, with oil or lard, this injunction being most imperative in the class of mild cases.

Surgeon-Major DE CHAUMONT presented a paper on the effects of climate upon health, and his conclusions were—1, that with proper hygienic precautions there is hardly a place on the earth where man may not enjoy good health, and that where this is not found possible it is from the existence of malaria; 2, that, admitting this much, there are, however, still differences existing which render residence in certain climates more desirable than in others, as most conducing to the fullest health and vigour; 3, that, the possibility of acclimatisation has been greatly exaggerated, but that there still remains a residuum of truth in the idea; 4, that there is still a certain importance to be attached to the climatic treatment of disease, although the particular factor or factors that produce the influence are still involved in much obscurity.

Dr. H. C. BARTLETT read a paper upon 'Water for Domestic Use,' in which a description was given of some of the chemical and vital forces which result or are set free by the powerful and almost universal agency of water. He detailed the results of many complex and minute analyses of water, and stated that he had found under his tests minute germs and spores similar in character to those found in the human body in the diseases where the fluids present in stomach derangements had been examined with micro-physiological skill.

Law Reports.

'CREAM.'

R. BEARDWOOD, milk dealer, 147, Burlington Street, Liverpool, was summoned for selling adulterated cream. It was stated that the 'cream' was a mixture of milk, starch, paste, and colouring matter. It was not, however, deleterious. A fine of 20*s.* and costs was imposed.

ADULTERATING BEER.

AT Stafford petty sessions a publican named James Moore was charged by the Inland Revenue authorities with having in his possession, and adulterating beer with, a quantity of grains of paradise, whereby he rendered himself liable to a penalty of 200*l.* The defendant pleaded guilty, and the Bench decided to impose a fine of 50*l.*

NUISANCE FROM SMOKE.

AT Hammersmith, Mr. E. G. Francis, of the Saccharine Works, Fulham Road, Hammersmith, appeared to answer a summons for using a furnace not constructed to consume the smoke. The defendant said the boilers were made by the first makers, who assured him that the furnaces were properly constructed. Mr. Sandison, the Government Inspector, said the furnaces were not constructed to consume the smoke. Inferior coals were used. Mr. Bridge fined the defendant 5*l.*, with 1*l.* 13*s.* 6*d.* costs.

ADULTERATED BRANDY.

AT the Barnstaple Petty Sessions, S. C. Ashton, landlord of the Red Lion Inn, Brauntor, was summoned under the Food and Drugs Act, charged with selling a quantity of brandy not of the 'nature, substance, nor quality of brandy,' on October 4. The complainant said he purchased of Ashton's wife a noggin of brandy, for which he paid 9*d.* A portion of this was analysed by the public analyst, who sent in a report to the effect that the brandy was adulterated with water and sugar, but with nothing injurious to the human system. Mrs. Ashton stated that she bought the spirit from a neighbouring hotel, and that she did not know it was adulterated. The bench imposed a fine of 10*s.* and costs.

DANGEROUS GOODS.

AT the Liverpool Police Court, Samuel Banner and Co. were summoned under the Mersey Docks Act for having sent ninety barrels of petroleum of a dangerous quality into one of the docks without acquainting the master. The solicitor to the board said that the offence was a serious one and fraught with danger to millions' worth of property. The defendants were fined 5*l.* and costs. Messrs Hopps and Sons were summoned for a similar offence. It was stated by the public analyst that the naphtha gave off an inflammable vapour at less than 100 deg. Fahr. The magistrate inflicted a penalty of 10*l.* and costs, and remarked that if there were any more cases he would impose the full penalty of 20*l.* The captain of the ship *Constance* was summoned for having other than safety matches on board his vessel, which was laden with six tons of gunpowder, in the Mersey. He said he had endeavoured to comply with the regulations, and that the matches were there unknown to him. The magistrate, however, said that they were all liable for the acts of their servants, and fined the captain 10*s.* and costs.

THE ROMFORD SURVEYOR.

THE surveyor of the Romford Local Board, W. Hood, was summoned to the Police Court, under the 196th section of the Public Health Act, for failing to render an account in writing and to deliver up a statement in writing of such moneys as he had received or disposed of on behalf of the Romford Local Board of Health, as their surveyor and inspector of nuisances. Defendant resigned office, and his term expired on the 3rd inst. On that evening the local board met, but defendant, who was in his office, declined to see the members or give up his books. Investigation had shown that no entry had been made during the past month, and that certain cheques had been issued without vouchers. Defendant set the board at defiance. An order of committal was made by the bench, to be suspended until the following Monday evening, to give him an opportunity of producing the books and accounts.

OBJECTING TO VACCINATION.

J. TALLANT, of Devonport Road, Shepherd's Bush, who carried a little girl in his arms, was summoned by the vaccination officer of the Fulham Union, to show cause why an order should not be made upon him to vaccinate his child. The defendant, who objected to vaccination, said he had one little girl taken ill after vaccination, who died. He felt strongly on the matter, as he had known many evils resulting from vaccination. He did not wish to subject his child to the risk, as she was now quite well. Mr. Bridge said the defendant must have the child vaccinated. He had no discretion, when the child was well. The defendant said he would rather trust in God's providence to protect his child than risk vaccination. Mr. Bridge said it was necessary for the safety of the public that the child should be vaccinated. He made an order for her to be vaccinated within fourteen days.

A DOUBLE MILK PROSECUTION.

J. FRANKS, a farmer, of East Acton, was summoned for selling milk to J. S. Rowe, a milkman, of Hammersmith, adulterated with 16 per cent. of water. The complainant was originally summoned by the Fulham Board, for selling milk to the inspector which was adulterated with 18 per cent. of water, but the case was adjourned to allow him to take proceedings against the defendant. The complainant said the defendant supplied him with milk. That which was left by the defendant's man on the 3rd instant was divided, and one portion sent to the public analyst. Mr. Claydon, for the defence, said his client was very much at the mercy of his men. He wished to supply pure milk, and he believed it was left at the complainant's house just as it came from the cows. The man was called, and said he assisted to fill the churns, but he did not see any water put in them. Mr. Bridge fined the defendant 3*l.* and two guineas costs, and the complainant 1*s.* and 2*s.* costs.

A WALL DISPUTE.

MR. JUSTICE FRY has had before him the case of *Dickey* v. *Pfiel*, a motion by the owner of 48 and 49, Charles Street, Drury Lane, to restrain the defendant, the owner of adjacent property, from raising a wall, originally 27 ft. in height, to the height of 33 ft., so as to interfere with the light and air to the plaintiff's windows. Mr. Marten, Q.C., for the defendant, offered an undertaking that if the building of the wall should be allowed to proceed, the fact of its being built should not be used at the hearing as an argument against the mandatory injunction for pulling it down again; but Mr. Webb declined this, and asked for an injunction in terms of the notice. Mr. Justice Fry made an order restraining the defendant from building or allowing the wall extending from the north-east corner of the building, at the north of No. 48, to remain at a greater height than the height at which the original wall stood on September 6 last, on which day notice of the present application was served.

OFFENCE AGAINST THE REGISTRATION ACT.

ELEANOR ALFORD, a young girl, appeared to a summons for having unlawfully made a certain false statement, with intent to have the same entered in the register of births. Mr. Williams said the case before the Court was of much public importance, and the summons was taken out under the 37th and 38th Vict., cap. 88, sec. 40, which said that 'any person who wilfully makes any false answer to any question put by a registrar relating to particulars required to be registered concerning a birth or death, or wilfully makes any false certificate or declaration, shall be liable on summary conviction to a penalty not exceeding 10*l.*, and on conviction on indictment to fine or imprisonment, with or without hard labour, for a term of two years, or penal servitude not exceeding seven years.' On February 6 a child was born to defendant; on March 19 the defendant, in registering the child, stated that she was married, and said her husband's name was Alford. She had also offended with regard to the Vaccination Act. Mr. Ellison committed the defendant to trial at the Surrey Sessions, but allowed her bail.

HOW SMALL-POX IS SPREAD.

E. WHITMAN, Dashwood Road, and L. Weller, Sterndale Road, Battersea, appeared to a summons, at the instance of the vestry of Lambeth, for having, without disinfection, transmitted clothing which had recently been exposed to infection from small-pox. Small-pox broke out in the families of the defendants, and after that clothing was pledged at a pawnbroker's in Wandsworth Road. The defendant Whitman declared that she was not aware her husband was suffering from small-pox, but relied upon a certificate from a doctor that he was only suffering from a cold. Mr. Ewlin stated that the certificate of the doctor showing that Whitman's husband was suffering from small-pox was given on August 11, and on the 13th the clothing was pledged. The case, at the request of the defendants, was adjourned, and upon the case being again called on Mr. Howard, surgeon, stated that he gave a certificate on August 9 that the husband of Whitman was suffering from cold. On the 11th, however, he found small-pox had broken out, and told the female defendant Whitman that her husband was suffering from it. The other defendant lodged in the same house. Mr. Ellison thought Weller might have acted in ignorance but Whitman had not. He dismissed the summons with regard to Weller, and ordered the other defendant to pay a penalty of 5*l.* and costs.

ADULTERATION OF BREAD.

E. BUTLER, baker, of 30 Pitfield Street, Hoxton, appeared to a summons charging him with having sold bread adulterated with alum. Mr. Walker prosecuted on behalf of the vestry of Shoreditch. Mr. Walker produced the certificate of the public analyst showing that the bread stated to have been purchased at the defendant's shop contained 15 grains of alum per 2 lb. loaf. The solicitor for the defendant said that his client had trusted the bread-making to his foreman, and from what he had since learned he would submit to the court. Mr. Walker urged that the certificate stated that the proportion of alum found made the bread injurious to health. The solicitor for the defence said that there was a disagreement on that point between professional gentlemen, and Professor Wanklyn would state the contrary. After hearing the Professor's evidence, Mr. Bushby said this case was not particularly affected by the question whether 15 grains of alum per 2 lb. of bread was injurious to health or not. It was clear that the bread was of inferior quality from alum being in it, and inferior from the loss of nitrogenous substance. He would deal with the case on that point, and as the defendant had pleaded guilty he would fine him only 20*s.* and costs. Mr. Walker intimated that on a future occasion he would be prepared with scientific evidence to support the statement as to the injurious effects of alum.

CHIMNEYS ON FIRE.

AT Greenwich, Mr. Bevan, who attended to support summonses taken out by the Metropolitan Board of Works against persons for having chimneys on fire, called the attention of the sitting magistrate to a complaint made by the members of that Board as to the nominal fines imposed at police-courts. Prior to the board having the power under the Act for the prevention of fires there was a *maximum* order made in such cases for the payment of 3*l.* 10*s.* for the attendance of firemen to extinguish such fires, and by the present Act the *maximum* fine was 20*s.* In many cases a nominal fine of 1*s.* had been imposed, with 2*s.* cost of summons. The expense in prosecuting these cases was great, and the consequence was that defendants who were summoned escaped such expenses, which were thrown upon the ratepayers. It was suggested that the circumstances in each case should be stated, to ascertain whether the fire was the result of neglect or accident, and that the condition of defendants should be inquired into. Mr. Balguy said that he had adopted the system which had been observed by his predecessors. He was glad that Mr. Bevan had made the representation to him, and he would take the matter into consideration. Seven summonses were then disposed of, and two fines of 5*s.* and 2*s.* costs were imposed, the occupant in one case admitting that the fire arose from straw in the grate.

THE RIGHT TO LAY DOWN GAS PIPES.

AN adjourned summons against the Wimbledon local board for refusing to permit the Mitcham and Wimbledon Gas Light Company to lay down a certain gas main pipe under the footpath in the Merton Road, came on for hearing and the magistrate's decision. The proceedings were taken under 10 Vict. c. 15, s. 9, which provided that, in a dispute, a plan should be determined by a magistrate. The company wished to lay the pipes under the footway on grounds of economy and safety to the public; the board, on the other hand, wished the pipes to be laid under the roadway to suit the convenience of pedestrians, and because it was intended to cover the footpath with asphalte. Mr. Bridge was of opinion that the gas company had a right to put down the pipes where they liked, and that the highway authority had to see that they were put down in such a way as not to be detrimental to the public. But both parties did not agree to that construction of the Act, and asked him to decide in what part of the road the pipes should be placed. He had listened to both sides, and had seen the road. The safety of the public was the only thing to be considered, and he was of opinion that the best place to lay the pipes was under the footway. He added that he would back up the surveyor in any plan which he thought was best for carrying out the works.

UNWHOLESOME DWELLINGS.

C. EDNEY, the owner of 10, Symons Street, Chelsea, was summoned to show cause why an order should not be made on him requiring him to do away with certain nuisances at his house. Mr. Young, sanitary inspector for Chelsea, said the defendant had notice on the 6th of last month to abate a nuisance on his premises—viz., that the drains were untrapped, water of a putrid character percolated the foundations, and there was other neglect of sanitary precautions. That notice had been disregarded, and on Saturday last the summons was taken out, to which the defendant did not now appear. It was a six-roomed house, occupied by no less than six families, amounting to twenty-three persons. The ground of the yard was rotten, and the soil from the neglected drains, which were opened last Saturday, and had not been closed, was lying about the yard, and the basement was in a filthy state—so much so that the medical officer was of opinion that epidemic disorders would spread. Already the parish had taken proceedings for overcrowding. Mr. D'Eyncourt decided to make an order that the work be done in twenty-one days. Mr. Young said the matter was serious. The drains were stopped, and could be unstopped in a day or two, and the whole of the work done in three or four days. He would not ask for a short order were it not for the urgency of the case. Mr. D'Eyncourt therefore made the order for the work to be done in seven days, defendant to pay the costs of the proceedings against him.

AN UNSANITARY POLICE-COURT.

AT Southwark, Dr. Bateson, the medical officer of St. George's Vestry, who was in attendance to support a summons obtained by Mr. Edwards, the sanitary inspector, complained of the filthy and unhealthy condition of the public entrance to the police-court. He stated that on passing the outer door he found a large room crowded by a number of rough-looking people, who pressed against a closed door leading to the ante-room of the court. He found the place in a terribly filthy condition. The effluvia was dreadful, and quite sufficient to breed typhus fever of the blackest kind. The people in the room appeared very dirty and unruly, and had it all their own way, as there was no officer to keep them in order. In fact he and Mr. Edwards had the greatest difficulty in obtaining an entrance. What he particularly wished to call his worship's attention to was the entrance-hall. There was no ventilator, or anything to let off the filthy smells. There were two small windows, but they were kept closed on account of their overlooking the yard where the prisoners were brought in, and on the other side a blank wall. He wondered that a malignant fever had not broken out, and he was positive that unless the place was cleaned and properly ventilated fever would be generated in the neighbourhood. Mr. Benson observed that the attention of himself and colleague had been called to the state of the entrance, and they had reported the circumstance to the Board of Works. He was obliged to Dr. Bateson for his remarks.

IMPURE GAS.

THE Commercial Gas Company were summoned to answer a complaint laid on behalf of the Metropolitan Board of Works, of having supplied to the public gas of less purity than required and allowed under the provisions of the Gas Act, 1875. There were eight summonses against the company, each laying a complaint for a different day, and the penalty for the offence, under the Act, is 50*l.* a day. On Friday the complaint against the company of the quality of the gas supplied to the public was debated at the meeting of the Metropolitan Board of Works. That body decided, on the report and certificate of the chief gas examiner, that the company were liable, and instructions were given to the solicitor to at once take proceedings. Mr. Spencer made application on behalf of the Board of Works to the magistrate at this court at the last moment on Saturday afternoon. Mr. Bushby, after looking into the private Act of the company, thought that under Jarvis's Act he would not be justified in doing that, as the company ought to have the opportunity of being heard. Mr. Spencer said that the company had a right of appeal to the Board of Works against the report and certificate of the gas examiner. It was frequently done, but in this case there had been no appeal, and the company were liable. All that was required under the Act was to give proof of the report and certificate. The gas examiner was an independent public officer, standing between the company and the Board of Works. Mr. Bushby thought that there was much objection to the summary proceeding of issuing a warrant of distress for the recovery of 400*l.* against a company. The summonses were then adjourned, the secretary of the company stating that the matter would be fought out.

DISEASED MEAT AT BIRKENHEAD.

AT the Town-hall, Birkenhead, Mr. Moore made an application to Mr. Preston, the stipendiary magistrate, in regard to an order which had been obtained on the previous

day for the destruction of a pig, alleged to be diseased and unfit for human food, by Dr. Vacher, the Birkenhead medical officer of health. Mr. Moore affirmed his ability to produce evidence in support of his statement that the pig was perfectly sound, and asked the magistrate to consider the rebutting testimony. Mr. Preston consented to rehear the case. Dr. Vacher stated that on the previous day he examined a pig on the premises of Charles Heywood, pork butcher, of Watson Street. He found it suffering from spotted fever, which was contagious, the symptoms being large blotches over the skin and extravasation of blood beneath it. The intestines—in which he had no doubt he would have found some indications of disease—had been removed, as well as the stomach. The pig had probably been killed on account of disease, and was quite unfit for human food. Witness had seen similar cases before, and remembered a pig, not so severely afflicted with the same disease, being destroyed. It would be dangerous to health to use the carcase. Mr. Gregory, market superintendent, called by Mr. Moore, stated that on Sunday morning he gave Mr. Heywood permission to kill on his own premises a pig which, as witness was informed, 'had not taken its breakfast.' He afterwards examined the pig, and found nothing the matter with it, except a skin eruption. There was no fever, no measles, and no extravasated blood. The pig was quite fit for human food. Mr. Dobie, veterinary surgeon, said there was a slight redness of the skin, but no fever. The pig was suffering merely from skin eruption. There was no extravasated blood. Mr. A. Wren, veterinary surgeon, said the pig was quite fit for human food, the affection it was suffering from being quite common. An examination of the viscera here took place outside the court. Three other witnesses, butchers, named Heathcock, Cotterall, and Thornley, deposed that the pig was quite fit for food, one of them stating that he had seen pigs exposed for sale in a much worse condition. Mr. Preston said that, judging by the pieces submitted to him, the pig seemed to have been in a most diseased condition. After the statement of Dr. Vacher with regard to the appearance of the intestines, he could not believe that the carcase was sound and wholesome, and would make an order for its destruction. Mr. Moore gave notice of appeal.

NUISANCE FROM ASPHALTE.

MR. G. NOLAN, secretary of the Limmer Asphalte Works, appeared to answer a summons taken out by W. Raymond (one of the officers of health to the Poplar Board of Works), 'for a quantity of vapour arising from a large cauldron on the defendant's premises, the cauldron being used for mixing purposes, and that the effluvia proceeding from the said vapour was of an offensive nature, and injurious to health.' Mr. Young said that the board had received numerous complaints of the nuisance caused by the works of the company; in some cases it had had a very injurious effect on the health of some of the persons complaining. His worship had no doubt noticed the horrible smell prevalent in the streets when the asphalte was being laid. This was bad enough, but was not to be compared to the effluvium generated during the preparation of the stuff. A year or two ago, in consequence of complaints, the late Dr. Letheby was consulted, and by his recommendation one of the cauldrons was altered in such a manner as to cause the abatement of the nuisance as far as that was concerned; but for some reason or other the other cauldron was not dealt with in a similar way, and the nuisance was still as bad as ever. Mr. Raymond, inspector of the Poplar board, said that he served a notice on the defendant. Nothing had been done to secure an abatement of it. On August 10 witness visited the works; the cauldron complained of was then discharging vapour. The vapour was, in fact, pitch steam. The cauldron was in a shed, the funnel coming up through the roof. Numerous complaints have been made to the board. In November 1875 a notice was served on the company, in consequence of which one cauldron was altered to stop the nuisance. The other might be altered in a similar way. G. Johnson, a master shipwright, said that his house was within 100 yards of defendant's premises. The smell of the vapour that came from the mixing cauldrons was very offensive and obnoxious, and had had a very bad effect on the health of witness's wife and family. The vapour occasionally came over in thick clouds, and they could not then have their windows open, as the smell was so strong. J. Roberts and C. Barker, also residents, gave similar evidence, stating that they, and their wives and families, were affected injuriously by the effluvia. Dr. Ellison, medical officer to the Poplar board, stated that in his opinion the vapour was a nuisance, and injurious to health. The defendant contended that there was nothing injurious or hurtful to health in the smell that arose from the asphalte. Thousands of yards of it had been laid down in London—in front of shops, private houses, etc., and the company had never had a complaint from any of the inhabitants that the smell was hurtful; on the contrary, it was a most healthy smell. He called Dr. Wilson, surgeon, of Park House, Maida Hill; but Mr. Young objected to this gentlemen giving evidence, as he was a director. Mr. De Rutzen (there being no other witnesses called by the defendant) said that, according to the evidence, it was clear that the effluvium arising from this cauldron was a nuisance, and injurious to health. He should inflict a fine of 5*l.* on the present occasion; and if the necessary alterations for abating the nuisance were not made, and further proceedings were taken, the penalty would be doubled until the fine would amount to 200*l.*

BRIEF NOTES OF CASES.

COSTS CONNECTED WITH RATES.

1877. *Southampton Gas and Coke Company* v. *Southampton Guardians.*—Poor Rate Appeal. 12 and 13 Vict., c. 45. Reference to arbitrator. Taxation of costs out of sessions held within the order of reference and not irregular. (46 L. J., M. C. 238; L. R. 2 Q. B. D., 371; 36 L. T., 549; 41 J. P., 372.)

LANDLORD AND TENANT.

1873. *Pretty* v. *Bickmore.*—House leased with a defective street coal plate. Lessee to repair. Accident to passer-by. Defendant as lessor held not liable. Where premises are let to a tenant the landlord cannot be made liable for a nuisance existing on them unless it is shown that he could have removed it and did not. (L. R., 8 C. P., 401; 28 L. T., 704; 37 J. P., 552.)

RATING OF HOUSES.

1877. *Reg.* v. *St. Pancras Assessment Committee.*—Advertising boards erected against private houses under license from the owner. Held that the owner of the boards was not separately rateable, his occupation having no permanency about it. (46 L. J., M. C., 243; L. R., 2 Q. B. D., 581; 41 J. P., 403 [*Willing* v. *St. P.*]; 37 L. T., 126.)

SMOKE NUISANCE.

1859. *Manchester, Sheffield, and Lincolnshire Railway Company* v. *Wood.* 8 Vict., c. 20, section 114.—Nuisance from smoke. Held that the penalty only attaches where the engine is not constructed so as to consume its own smoke; and, therefore, where an engine is duly constructed as aforesaid, and the nuisance is due only to careless user, there is no liability under this section. (29 L. J., M. C., 29; 2 E. and E., 344; 1 L. T., 31; 24 J. P., 38.)

Legal Notes and Queries.

WATER-SUPPLY.

THE town of A. is supplied with water by the local board, from works purchased of a water company. At

the time of sale, the company had contracts with the owners or occupiers, as was most convenient, to supply water at an annual rent; but in the case of small cottages the contracts were always with the owners. This state of things was continued by the local board, and the town is now supplied by contract, and not by rate. An owner of cottages having refused to lay on water, after notice, the board did the work; but the owner refuses to pay for the water-supply. How can the amount be recovered?

The present income from water rents exceeds the expenditure for management of the works and interest of the debt, but is not sufficient for redemption of the debt. Many of the houses in the town have their own private supply.

1. If a water rate is made in respect of the cottages in question, upon what estimate should it be based?

2. Can the cost of supply be recovered from the owner?

3. Can the local board refuse to supply cottage property unless the owner signs a contract to pay the rent?

4. Are they bound to supply all houses on the application of the tenants?

[1. The water rate must be based on the annual value of the cottages.

2. Yes, if the annual value be less than 10*l*. (See Public Health Act, 1875, sect. 57; and Waterworks Clauses Act, 1847, sect. 72.)

3. No.

4. Yes; if the requirements of the Waterworks Act, 1847, have been complied with.]

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

'SANITARY INSPECTORS': SEWER GAS.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Permit me thoroughly to endorse the comments you made, in the SANITARY RECORD for September 28, on a 'medical officer of health's' letter on 'sanitary inspectors.' When the late Public Health Act was in progress I made every effort I was able to get the objectionable title 'inspector of nuisances' changed to the more agreeable one of 'sanitary inspectors.'

Medical officers of health are personally interested in doing all they can to raise the status of inspectors of nuisances, for the better the man and the higher his qualifications and knowledge, the easier and more pleasant will a medical officer of health's work become. It should never be forgotten that although circumstances have forced medical officers of health to become engineers, surveyors, and inspectors of nuisances, a medical officer of health is out of place in performing or advising on engineering or surveying work.

I want to see an equal partnership between the sanitary inspectors and the officers of health, and this equality can only be secured by raising the qualifications of our now inspectors of nuisances. As a step towards this my authorities have in all cases elected their inspectors to the honorary office of surveyor; and knowing how objectionable the title of inspector of nuisances is, I always address these gentlemen as 'sanitary inspector and surveyor,' save in official reports, when, of course, I make use of their legal title.

As to 'sewer gas,' it seems to me that Mr. Buchan would find fault with the arrangements of the newest Jerusalem—nothing pleases him save Buchan. I have had a long, long experience of drains and so-called drain ventilation, but I never met with any plan at all like Mr. Banner's until my visit to Brighton some year or so ago. Indeed, in all the plans for all the houses erected in Salford for five years, no plan of ventilation was so much as mentioned or specified. We, at last, insisted on the closet pipe being continued to the roof, and there left open. This was the most that was either done or insisted upon.

EDMUND J. SYSON,
Medical Officer of Health.

TURPENTINE AND TEREBENE AS DISINFECTANTS.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Unfortunately I did not arrive at Leamington in time to attend at the reading of Dr. Moffatt's paper on the above subject, but its appearance in your last issue induces me to beg the privilege of being allowed to make some observations upon it in your columns.

In my opinion it is the first duty of an intending author to make himself acquainted with the antecedent literature of his subject, not merely out of justice to previous workers, but also for the sake of his own reputation. I venture to think that had Dr. Moffatt pursued this course, he would never have written a paper which does not contain a single new fact, and which is, moreover, not free from serious errors.

The substance of Dr. Moffatt's contribution to sanitary science may be given in a few words. According to him, certain essences, as those of juniper and turpentine, develop ozone when in contact with the atmosphere, while 'terebene,' notwithstanding the claims which have been made (and refuted) in regard to it, is stated to be greatly inferior to turpentine as an ozoniser. Now, Sir, in order to point out where Dr. Moffatt is in error, and where he fails to do justice to other scientific workers, allow me to make a few historical remarks. Almost since the time when Schönbein discovered ozone, turpentine and other essential oils have been credited with the power of producing this substance by the action of the air; and upon this assumed rather than established property, their character as disinfectants has been based, or rather was based, until my own researches proved the error of this conception.

It is now nearly seven years ago since I commenced my experiments upon this subject, my first paper upon it being communicated to the Chemical Society of London.* At that time I determined the approximate quantities of oxygen which the oils of turpentine, juniper, bergamotte, chamomile, cloves, lemon, thyme, capivi, cubebs, and other substances are capable of absorbing from the air, and it was also shown that the reactions exhibited by the oxidised oils, although like, in many respects, to those of ozone, were not really produced by this agent.

In a continuation of this research, I confined my attention for a time to turpentine; and in my next communication† to the Chemical Society, I was enabled to show that the reactions above alluded to are due to the formation of an organic peroxide of an unstable nature, and splitting up by contact with water into peroxide of hydrogen and camphoric acid as follows:

$$C_{10}H_{14}O_4 + 2H_2O = H_2O_2 + C_{10}H_{10}O_4$$

It is the peroxide of hydrogen thus produced which exhibits the characters previously attributed to the presence of ozone.

I next generalised my methods of experiments, and determined that the formation of peroxide of hydrogen from the various essential oils is referable to the fact that they contain as a proximate nucleus a body termed by chemists cymene, $C_{10}H_{14}$, which may be obtained from each of them by suitable means. This result I communicated in a paper‡ read before the British Association meeting at Bristol.

Knowing the value of peroxide of hydrogen for purposes of disinfection, I was led naturally to study the properties of the aqueous product which is obtained when turpentine

* *Journal Chem. Soc.*, June, 1874.
† *Ibid*, Mach, 1875.
‡ *Chemical News*, Sept. 17, 1875.

is subjected to a continued current of air in the presence of water, and in conjunction with my friend, Mr. M. Zingler, I worked out a process by which this result could be attained on a commercial scale. We gave to our product the name 'Sanitas,' and described its antiseptic and disinfecting powers to the British Association meeting at Glasgow.*

In a yet later paper, † I applied the knowledge which had been acquired in these various investigations, in explanation of the hygienic influences of pine and eucalyptus forests, and you will remember, Sir, that on a subsequent occasion I delivered a lecture ‡ at the Society of Arts, in which I went more fully into these matters, and described the manufacture and properties of 'Sanitas.' At the same time I demonstrated to my audience by an experiment similar to that which Dr. Moffatt brings forward as original, that terebene is vastly inferior to 'turpentine' as a disinfectant; it was also shown that the value of turpentine as a disinfectant is entirely due to the formation of those compounds which in their combined and isolated state constitute the solution of 'Sanitas.'

The manufacture of this article has enabled me to repeat and extend my researches, so that to-day there is not the least justification in the world for any longer disseminating the untrue teaching that turpentine or any other essential oil is an ozonising agent. After this statement, Sir, I think Dr. Moffatt will agree with me in the remarks I have made above, upon his communication to the Sanitary Congress at Leamington.

Scientific Club, CHARLES T. KINGZETT.
Oct. 20, 1877.

SANITARY INSPECTORS *v.* INSPECTORS OF NUISANCES.

(*To the Editor of the* SANITARY RECORD.)

SIR,—The letter of your correspondent, 'M.O.H.,' exhibits such lamentable egotism, and is so openly discourteous to the class more especially assailed by its asseverations, that few would have supposed it to emanate from the pen of a member of the medical profession, had not that fact been so broadly asserted.

Dismissing the real question at issue, viz., whether inspectors should be styled sanitary inspectors or inspectors of nuisances (by denying the existence of a sanitary inspector, inasmuch as that term is not employed in the Public Health Act, 1875), 'M.O.H.' next attempts most illogically to demonstrate that the more ignorant of sanitary affairs an inspector is, the better he is qualified to perform his functions satisfactorily, or, in other words, to cause the minimum amount of trouble to the medical officer. Surely it cannot be to the adoption of analogous views concerning qualifications by the sanitary authority whose officer he is that 'M.O.H.' is indebted for his appointment.

'M.O.H.' condemns the action of the Sanitary Institute of Great Britain in proposing to establish examinations in sanitary and cognate matters, and to award certificates of competency to inspectors and others desirous of qualifying for that office, and would actually, ignoring all other qualifications, consider an applicant 'singularly disqualified' if he held such a certificate of fitness as the institute proposes to confer.

Doubtless 'M.O.H.,' by thus complacently opposing his opinion to the collective wisdom of the Sanitary Institute of Great Britain, and sitting in judgment upon its proceedings, has, ere this, through the medium of your columns, elicited more smiles than he contemplated.

Relying on the fact that a certain amount of deference has hitherto been shown to his opinion by his superiors in matters relating to the selection of inspectors in their particular district, 'M.O.H.' jumps to the conclusion that all other medical officers are similarly situated, and presuming a certain spirit of combination to exist amongst them, courts their united action to neutralise the efforts of those who would gladly qualify for the certificate in question, and to render abortive the institute's efforts in that direction, which he stigmatises as 'an illustration of extreme and busy action' on the part of the institute.

It is amusing to find 'M.O.H.' charitably accrediting us with much ignorant-intelligence (*sic*), which he, however, endeavours to neutralise by saying we add to this a deal of self-asserted importance.

Leaving, however, to conjecture what manner of inspectors those two qualities, when taken in combination, may be expected to produce, I must hasten to express my entire concurrence in that portion of 'M.O.H.'s' letter where he states that 'the medical profession is a good illustration of the evil results of small-diploma and small-degree men; these are the people who are always the most self-sufficient and bumptious.' Of the truth of this 'M.O.H.' furnishes a most curious exemplification.

4, Havelock Villas, THOMAS H. DALE,
Beverley Road, Hull. Sanitary Inspector.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Having received the most courteous treatment from the authority it has been my pleasure to serve for four years, and working most harmoniously with my co-adjutors, I felt no personal interest in this discussion, and was quite content to have remained silent; but the intemperate and bombastic letter of your correspondent 'M. O. H.' in your issue of the 12th inst., I think, should incite all of us, who have any self-respect, to protest against such assumption of power as he professes to exercise.

I am a member of Mr. Hugh Davies's profession, and the sentiments expressed by that gentleman in your issue of the 5th inst. I fully indorse; in fact, I think very cogent reasons may be given for going further than he does, and, if needs be (on some future occasion with your kind permission) we will endeavour to elucidate this.

Now, as to your correspondent 'M. O. H.' What does it mean? Who is he? He says, 'I, too, am an officer of health.' I am very glad, for the sake of our profession, that he is not an inspector of nuisances, for the tone of his letter makes it very clear to the most 'ignorant intelligence' that the status he holds in 'our own profession' is one of those 'small diploma men' whose characteristics he so pertinently describes as 'people who are always the most self-sufficient and bumptious.'

I have a great dislike to anonymous writing; so 'M. O. H.' has only to write courteously as a gentleman and in his proper name, and he shall be replied to in the same manner by AN INSPECTOR TO A RURAL
Oct. 15, 1877. SANITARY AUTHORITY.

(*To the Editor of the* SANITARY RECORD.)

SIR,—I have been very much amused while reading the correspondence of your journal of the past three weeks respecting sanitary (I beg pardon) nuisance inspectors.

I cannot for the life of me see what ground Medical Officer of Health has for complaint, as he declines to *permit* his inspector to assume the title of sanitary inspector; and if the general public of the district are so ignorant as to affix the Esq. to the name of the inspector, Medical Officer of Health, as his superior officer, should not allow him to be so abused and libelled, but bring them before the proper authorities, and also communicate with the school board authorities every time he receives a letter addressed to Medical Officer of Health without the Esq. attached.

'M.O.H.' (October 12) appears to be surprised, and anxiously inquires what sort of things sanitary inspectors are—says he has never seen one and goes on to declare they do not exist.

I beg respectfully to inform 'M.O.H.' that they do

* *Pharm. Journ.*, Sept. 23, 1876, and *Chemical News*, Sept. 23 and 30, 1876.
† *Pharm. Journ.*, Dec. 2, 1876.
‡ *Society of Arts Journal*, Feb. 16, 1877.

exist, and did exist long before Medical Officers of Health and 'M.O.H.' were dressed in their 'little brief authority before high heaven,' and if 'M.O.H.' had kept his weather eye open he would have discovered the sanitary inspector before now, possessing a thorough practical knowledge of sanitary work in general sprinkled with a little sanitary science.

I trust the Sanitary Institute of Great Britain will not be so influenced by the eloquent epistles of Medical Officer of Health and 'M.O.H.' as to give up all thoughts of certifying sanitary inspectors.

If 'M.O.H.' is a fair sample of the small diploma men and men of small degree of their own profession, hey are certainly a self-sufficient and bumptious class of ndividuals.

S. S. I.

(*To the Editor of the* SANITARY RECORD.)

SIR,—In your issue of the 12th inst., 'M. O. H.' appears very tenacious as to which of the above terms should be used for a class of officers who have the hardest and most difficult duties to perform under the various Sanitary Acts, in fact have all the work to do, only consulting the medical officer of health when professional advice is required. Your correspondent says: 'I never heard of a sanitary inspector, what is he?' as though he was a *rara avis*. If 'M. O. H.' was appointed previous to the passing of the Public Health Act, 1875, and had read up the twenty-five various Sanitary Acts then in force, he would find the term 'sanitary inspector' quoted in several instances, also in manuals written by officials belonging to the Local Government Board, whose opinion cannot be doubted. If the Act of 1875 does not acknowledge the term 'sanitary inspector,' neither does it that of 'officer of health,' the style used by 'M. O. H.'

Provision was made for the office of 'sanitary inspector' in 1855, by 18 and 19 Vict. cap. 121, sect. 9, and the term used throughout the Act. This section was repealed in 1860, by 23 and 24 Vict., cap. 99, sect. 1, and provision made by section 9 for the appointment of inspector of nuisances. Section 3 of the latter Act again mentions 'sanitary inspector,' being repealed in 1866 by section 17 of 29 and 30 Vict., cap. 90. The Act of 1868, 31 and 32 Vict., cap. 130 I believe is not repealed, and thus defines the meaning of the term 'officer of health.' 'Officer of health' shall mean and include medical officer of health, sanitary inspector, or any statutory officer performing the duties which a medical officer or sanitary inspector performs under or by virtue of any Act of Parliament. The above evidence is, I think, sufficient to prove that the term 'sanitary inspector' is quite as consistent as that of 'officer of health.'

'Medical officers of health' and 'sanitary inspectors' are appointed by the sanitary boards, with the approval of the Local Government Board, and as the duties of both officers are distinctly defined by the General Order of 1872, I fail to see how 'M.O.H.' can speak of 'his' inspectors of nuisances, or have the power to dictate to them. How they shall style themselves, or be styled by the public, whether they have Mr. or Esq. attached to their names, or both, is too absurd to discuss.

As regards the Sanitary Institute of Great Britain, I shall be very glad to see the time when certificates are granted to sanitary inspectors, as I believe it will tend to raise their position, and their respective duties being so well defined, I cannot imagine it would in any way lower the importance of 'M.O.H.'

Fortunately for myself, I have had the honour of serving under a medical officer of health for the last five years, who is well known and appreciated by both sanitary board and inspector for his sanitary as well as his medical knowledge and uniformly gentlemanly demeanour, one who trusts in his own profession, and does not attempt to combine with it that of engineer, surveyor, or inspector.

A MEMBER OF THE WESTERN COUNTIES ASSOCIATION OF SANITARY INSPECTORS.

October 15, 1877.

DISINFECTION BY STEAM.

(*To the Editor of the* SANITARY RECORD.)

SIR,—I should feel much obliged if you of any of your correspondents could give me any information with regard to disinfection by high pressure steam. What pressure is necessary? what is the best form of chamber? and what form of door will combine the requisite strength and tightness with convenience of access to the interior of the chamber? I should be glad to know where such an apparatus may be seen at work.

H. FRANKLIN PARSONS, M.D.

6, Banks Terrace, Goole,
October 22, 1877.

DEVILLE *v.* THE HARROGATE IMPROVEMENT COMMISSIONERS.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Judgment was given in this case in July last in favour of the plaintiff (Dr. Deville) on all points. The costs of this trial, so far as Dr. Deville is concerned, are as follows: Total of Messrs. Paley's account (Dr. Deville's solicitor), 326*l.* 16*s.*; less paid by the Harrogate Commissioners, 182*l.* 9*s.* 6*d.*; total, 144*l.* 6*s.* 6*d*; leaving 144*l.* 6*s.* 6*d.* to be paid by Dr. Deville. This is exclusive of his personal costs in attending the trial, journeys to London, etc. Towards the payment of this sum I have received subscriptions to the amount of 88*l.* 5*s.* Dr. Deville having vindicated his position, the sole object for which he commenced proceedings against the Commissioners, has resigned his appointment as Medical Officer of Health for Harrogate, feeling that this course was the one most consistent with his own self-respect, and the best means of showing that in these proceedings he was influenced by no merely selfish motive. It only remains for me to express my personal obligation to those who have assisted by their subscriptions in defraying so large a portion of Dr. Deville's expenses.

S. W. NORTH,
President Yorkshire Association of Medical Officers of Health.

Castlegate, York, Oct. 20, 1877.

Review.

A Plan for rendering Salted Meat more Nutritious, thereby preventing Scurvy. By ROBERT GALLOWAY, F.C.S., Professor of Chemistry in the Royal College of Sciences of Dublin, etc. Second edition enlarged. Pp. 16. Dublin: Hodges, Foster, and Co.

THIS is a second edition of a pamphlet reviewed in this journal in November, 1876. To the main point urged by Mr. Galloway, viz., that it would be advisable to try and restore to salted meat what it loses in salting, so as to render it more nutritious, there can be no objection; his contention is that that lost constituent is the potassium phosphate, which, he says, must be added to the meat either before or at the time of eating. In our former review we considered the question, and showed the improbability of the potassium phosphate being the substance whose absence produces scurvy, and to the objections cited Mr. Galloway has made no adequate reply. He has not shown how it is that scurvy arises in cases where the potassium phosphate does exist in the food; and, in reply to an objection that cocoa contained the constituents of that salt in large quantities, he says that it may not be in the form of potassium phosphate, and that the sodium salt cannot take its place. Now, in the first place, the published analyses of cocoa-ash show that the phosphoric acid forms from 29 to 39 per cent. of the ash, and potash from 33 to 37, so that of the total ash, from 70 to 76 per cent. is phosphoric acid and potash; it is hence

reasonable to expect that those substances exist in combination, to some extent at least. Secondly, although both lime and magnesia exist in the ash, soda is either absent, or is only a trace. We have thus in every ounce of cocoa about 10 grains of phosphoric acid and potash; in every ounce of lime-juice less than one grain of these substances. Yet Mr. Galloway insists that it is the small quantity in the latter that is the efficient cause of the preventive and curative action of lime-juice, whilst the much larger amount in the former is apparently inactive! Again, he says that the agent is inefficient unless taken at the time the meat is eaten; but the lime-juice never was nor is taken at that time, but always some little time before dinner. Again, the alkaline phosphates in fresh beef are about 1·23 per cent., so that 1 lb. would contain about 86 grains, and the ration of a soldier or sailor about 54 to 60 grains. The exact amount lost in salting is not certain, but it would appear to be (from some observations at least), about 40 per cent., or about 22 to 24 grains on a soldier's ration. Mr. Galloway's case, therefore, stands thus: Scurvy (he says) is due to the loss of (say) 22 grains of potassium phosphate; restore this and scurvy is prevented. But scurvy is prevented by a ration of one ounce of lime-juice, which contains less than one grain of the salt. Is it reasonable to refer the result to the one grain of potassium phosphate rather than to the much larger amount of vegetable acid? Another pamphlet, by Mr. Anderson, of Coventry, urges the phosphate question also, but on somewhat different grounds. He, too, admits the efficacy of lime-juice, but argues that it is due to the solvent action of citric acid on insoluble phosphates. He does not insist on potash, like Mr. Galloway, nor does he demand such inordinate credit for the small amount of potassium phosphate in the lime-juice. At the same time Mr. Anderson's view would inevitably lead to the conclusion that pure citric acid was a much better antiscorbutic than lime-juice, which experience has not shown.

In conclusion we may say that, although we cannot agree with Mr. Galloway's views, still his proposal is a perfectly harmless one, and we see no reason why it should not be tried. It may do good, and cannot do any injury.

Sanitary Inventions.

MUSGRAVE'S SLOW COMBUSTION STOVES.

WITH every description of fuel at extravagant prices, and stoves constructed with a lamentable disregard of both science and common sense, the need of a reform in that most important of all sanitary questions, the heating of our public buildings, houses, and apartments, becomes a question of vital necessity.

That old-fashioned contrivance, an open stove, has obtained such a firm hold upon our sympathies, and the charms of the cheerful fireside have been so long lauded, that we have, from the mere force of habit and our proverbial tolerance of established institutions, too long neglected the advantages afforded by modern enterprise which has provided us with heating apparatus, economical, and efficient, and admirable from a sanitary point of view. While acknowledging that an open fire possesses some advantages compared with close stoves constructed upon faulty principles, we must admit that provided thorough ventilation, a sufficient degree of heat, and the economical consumption of fuel are combined, little excuse remains for retaining our present form of open fireplace which is wanting in all these most desirable qualities.

A stove that will only consume in twenty-four hours the same quantity of fuel required by an open grate for one-fourth of that time, and will moreover thoroughly warm the air of the apartment in which it is placed, must recommend itself to the favourable notice of sanitarians and economists.

The stoves under notice have three most essential good qualities, they are reasonable in first cost, economical in action and thoroughly efficient. Their supply of fresh air is drawn through a tube direct from the external atmosphere instead of depending upon the imperfect closing of doors and windows to admit an uncertain and insufficient supply. Not only is the discomfort of draughts rushing towards the chimney and chilling the occupants of an apartment on one side, while the fire roasts them on the other, avoided, but every particle of air in the apartment is gradually raised to a sufficient and comfortable temperature without the unpleasant and injurious effects produced by burnt air. This warming of the air without burning is a never-failing source of comfort where these admirable stoves are in use. Should a moist warm atmosphere, so beneficial in cases of lung and chest disease, be desired, it may be readily obtained, the proportion of moisture being easily and certainly regulated. Patients suffering from bronchitis, asthma, and phthisis have, under the advice of leading physicians, had the advantage of the soothing influence of the conditions most suited to their various maladies produced by the use of these stoves. By their gradual consumption of fuel they secure, if desired, a constant uniform temperature throughout the winter, both by day and night, while the cost for fuel is merely nominal. They require attention but once in twenty-four hours, and burn better with coke or cinders, reducing the cost to the utmost point of economy. No dust or dirt can possibly escape into the apartment, and the danger from fire is entirely avoided. In the summer, when not in use for heating purposes, the inlet tube serves to supply the apartment with cool fresh air. Where desirable, an air warmer is fixed in basement, and hot air delivered from that to apartments.

Every variety of size may be had, from the smallest suitable for a small sitting-room, to an apparatus sufficient in capacity to warm and ventilate the ward of an hospital or infirmary, a town hall or cathedral. Tasteful and chaste in design when intended for halls or apartments, efficient under all circumstances, economical in use, and thoroughly substantial in every detail, we can heartily recommend these stoves to every one of our readers who desires to reduce his expenditure in fuel to the barest possible limit, and secure thorough ventilation and the mild and comforting warmth of summer in the depth of winter. Our attention has also been directed to the hot water apparatus manufactured by the same house, of which for excellence of design and efficiency in action we can speak in terms of warm approval, having had an opportunity of observing the good results obtained by their use in many public institutions. Messrs. Musgrave and Co., Belfast, are the patentees and manufacturers. The various apparatus may be seen in action at 97, New Bond Street, London.

THE HYPOTHERMIC LIGHT.

ONE of the great attractions of the Exhibition of Sanitary Appliances at Leamington, was the 'Hypothermic' light on the Sanitary Engineering and Ventilation Company's stand, which was shown in operation. The light was exceedingly brilliant, white, and steady; and we understand that there is considerably less heat and fewer deleterious products of combustion than with an equal light obtained by the ordinary means, as well as a large saving in cost. This result is achieved by generating in a very simple manner, near the burner, an exceedingly rich gas, which combines with the ordinary gas, and produces a light of nearly three-fold power.

Notice of Meeting.

YORKSHIRE ASSOCIATION OF MEDICAL OFFICERS OF HEALTH.

THE annual meeting will be held on Wednesday, October 31, 1877, in the board room of the Local Board of

Health, Ilkley. *Programme*: Committee meeting, 1 P.M.; meeting for association business, 1.30 P.M. *Agenda*: 1. The following medical officers are proposed as members: J. Hardwicke, Rotherham, Urban, proposed by F. T. Griffiths, seconded by S. Drew; C. Husband, Ripon, Urban, proposed by T. Deville, seconded by F. T. Griffiths. 2. To receive the report of the committee and the balance sheet for 1876-77. 3. To elect officers and committee for 1877-78. 4. Moved by F. T. Griffiths, M.D.: 'That the council be empowered to admit at any time any medical officer of health who may be regularly proposed and seconded at any ordinary meeting. General meeting, 2·30 P.M. 5. Paper by G. Goldie, Esq. 6. Paper by H. F. Parsons, M.D.: 'An improved method of applying Nessler's test for the estimation of ammonia in water analysis. The new sewerage works at Ilkley will be open to the inspection of any members who may wish to see them, and who will meet at the office of the Local Board of Health, at 11·15 A.M. Luncheon at the Crescent Hotel, Ilkley, at 5 P.M., by invitation of Dr. Scott, who will be glad to receive early notice from members who intend to be present.

H. FRANKLIN PARSONS, M.D., Secretary.
Goole, October 17, 1877.

'AN UNHEALTHY AREA IN SHEFFIELD.'

WITH reference to a leader on this subject in our last issue, in which we expressed satisfaction that the Sheffield town council had decided by a large majority to take immediate action on Dr. Griffiths' report, our attention has been called to the fact that the improvement scheme which was recently adopted by the council, deals with an area quite distinct and very remote from the area reported upon by Dr. Griffiths. We were mistaken in attributing to the town council any action with reference to the area condemned by the influentially signed requisition which led to Dr. Griffiths' report. It may be useful to repeat that this area has a population of more than 20,000 persons, among whom the rate of mortality during 1876 exceeded by 52 per cent. the rate which prevailed in the rest of the borough. It may be presumed that the requisitionists will not lose sight of their proposed action under the Artisans' Dwellings Act, and that they are aware that the eighth section of that Act makes provision for inquiry on refusal or omission of a local authority to make an improvement scheme on receipt of an official representation, such as that recently made by Dr. Griffiths.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

AINLEY, Daniel, L.R.C.P. Edin., M.R.C.S. Eng., has been reappointed Medical Officer of Health for the Halifax Urban Sanitary District, at 100*l.* per ann. for three years.

AYERS, Mr. William Winckles, has been appointed Inspector of Nuisances, for the Towcester Rural Sanitary District, vice Sansom, whose appointment has expired.

CATHERWOOD, Mr. Joseph Edward, has been appointed Inspector of Nuisances, for the Lichfield Rural Sanitary District, vice Pritchard, resigned.

CORK, Mr. Charles, has been reappointed Inspector of Nuisances for the Steyning Rural Sanitary District, at 120*l.* for one year.

ENGALL, Mr. John Anthony, has been appointed Clerk to the Staines Local Board and Urban Sanitary Authority, at 85*l.* per ann., to the Staines Guardians at 150*l.* per ann., and to the Rural Sanitary Authority, at no fixed salary, but usually by a vote of 35*l.* every Michaelmas.

HALL, Mr. James, C. E., has been appointed Surveyor to the Corporation and Urban Sanitary Authority of Stockton-on-Tees, vice Edwards resigned, at 300*l.* per ann.

HUBBERSTY, Mr. Philip, has been elected Chairman of the Wirksworth Local Board and Urban Sanitary Authority, Derbyshire.

JEFFERY, Edward, M.D. King's Coll. Aberd., has been reappointed Medical Officer of Health for the Lowestoft Urban Sanitary District and Superintendent of the Sanatorium, at 120*l.* per ann.

MACLEAN, John Hugh, L.R.C.P. Edin., L.R.C.S. Edin., has been appointed Medical Officer of Health for the Ashborne Urban Sanitary District, vice Greaves, whose appointment has expired.

MOORE, Frederick Flood, L.R.C.P. Edin., L.R.C.S. Irel., has been appointed Medical Officer of Health for the Burnham Urban Sanitary District, vice Phelps, whose appointment has expired.

PRESGRAVE, Douglas C.W., L.F.P.S. Glas., has been appointed Medical Officer of Health for the Towcester Rural Sanitary District, at 10*l.* 10*s.* per ann., and 2*l.* 2*s.* per case.

PRITCHARD, Mr. Benjamin Lewis, has been appointed Inspector of Nuisances for the Brecknock Rural Sanitary District, vice Isaac, resigned, at 120*l.* for one year.

TUTTIETT, Frank Bampfylde, M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the Newport, Isle of Wight, Urban Sanitary District, vice Waterworth, resigned.

WANKLYN, Dr. James Alfred, has been appointed Public Analyst for the Borough of Shrewsbury, vice Blunt, whose appointment has expired at 21*s.* per analysis.

VACANCIES.

GUILDFORD. Public Analyst. Application, November 2, to Ferdinand Smallpiece, Town Clerk.

KIRKLEATHAM URBAN SANITARY DISTRICT, Yorkshire. Medical Officer of Health: 20*l.* per ann. Application, 26th instant, to M. B. Dodds, Clerk to the Authority, Stockton-on-Tees.

LEOMINSTER URBAN SANITARY DISTRICT. Inspector of Nuisances. Application, 6th Nov., to G. T. Robinson, Clerk.

SOUTH STOCKTON LOCAL BOARD AND URBAN SANITARY AUTHORITY, Yorkshire. Surveyor and Inspector of Nuisances: 200*l.* per ann. Application, 31st instant, to Joseph Dodds, Clerk, Stockton-on-Tees.

SOUTH STONEHAM RURAL SANITARY DISTRICT. Inspector of Nuisances for No. 2 District: 20*l.* per ann. Application, 19th instant, to Joseph Robins, Clerk to the Authority, Southampton.

WEST ASHFORD GUARDIANS AND RURAL SANITARY AUTHORITY, Kent. Clerk.

WESTBURY ON SEVERN URBAN SANITARY DISTRICT. Inspector of Nuisances: 25*l.* for one year. Application, Nov. 6, to M. F. Carter, Clerk to the Authority.

WHITBY LOCAL BOARD AND URBAN SANITARY AUTHORITY. Surveyor. Application, November 1, to R. E. Pannett, Clerk.

SANITARY PATENTS.

3116. Improvements in the manufacture of bread and in machinery or apparatus connected therewith. Archibald Clarke, Glasgow.

3365. Improvements in effecting the destruction of noxious vapours or gases, and in the apparatus or means employed therein. Timotheus Ignatius Alberdingk, Amsterdam, Holland.

3395. Improvements in the treatment of human excrement, both solid and liquid, and in the deodorising organic matter, and in the means or apparatus employed therein; part of such means and apparatus may be employed for treating sewage matter, and filtering and deodorising sewage and other water. Bridge Baron Standen, Bradford, Yorkshire.

3426. An improved apparatus for use in the treatment and cure of fevers and other diseases. Edward Johnson Hobbs, Ramsgate, Kent.

ABSTRACTS OF SPECIFICATIONS.

451. Water-closets. B. Finch.

This consists mainly in the combination of a water-closet basin and trap, both made of earthenware, and with an intervening metal plate by which the connection of the two parts is made; also in a form of water-closet valve which closes automatically, and independently of the rod by which it is raised, and in which provision is made for an 'after flush.'

480. Valves for closets, etc. W. Ross.

This relates, first, to guiding the valve part in lifting cup sucker service valves, by a central spindle working within or over a spindle in the lifting part; a small hole is bored through the boss on the sucker or the sucker itself, for releasing the valve. There is also a new arrangement of a service disc valve and piston tap fitted to the main service pipes direct to give a regulated supply of water at each action without use of service cisterns, and save waste; also a double disc piston equilibrium valve with lateral inlet port of special form, etc.

NOTICE.

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Original Papers.

THE NECESSITY FOR FURTHER LEGISLATION FOR PREVENTING THE EXTENSION OF RABIES.

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THE object of the present paper is to direct attention to the great and alarming increase of rabies, to give a slight sketch of the present epidemic, more especially that portion of it which has fallen directly under my own observation, to show the uselessness of the existing means of prevention in the hands of local authorities, the necessity for further legislation, and the direction that that legislation should take.

Increase of Hydrophobia.

In the twenty-eight years from 1848–75, the annual fatality from hydrophobia in England may be divided into four groups, corresponding to somewhat unequal periods of time, viz. :

1. Eight years, from 1848 to the end of 1855, in which fourteen people on an average died yearly from rabies.

2. Eight years, from 1855 to the end of 1863, in which it was one of the rarest diseases known, the deaths only averaging two or three a year; in one year, indeed (1862), the mortality had sunk almost to zero, for then, out of over 400,000 deaths, one of rabies is alone recorded.

3. Five years, up to the end of 1869, a period on the whole of increase, averaging seventeen annual deaths, but showing great oscillations of mortality, in one year a total of seven, in another of thirty-six.

4. A recent group of nearly eight years, the returns of only six being as yet published, but in which the increase is very general and significant, showing that in not one of the six less than twenty-eight, and that on an average forty, people died from this disease.

Of the remaining years (1876 and the present one), some judgment can be formed from the records of coroners' inquests, and accounts in the daily and medical journals, and although it will not be well to risk the statement of definite numbers, it is certain that the deaths from hydrophobia since the last returns, are very far in excess of any year of which we have definite records. Taking the six known years, in them it was three times more prevalent than in the first period, and thirteen times more than in the second, or if the exceptional year 1862 be taken, the increase is forty-fold. It is true the numbers considered in themselves are very small when compared with either the total population or the deaths from all causes, and the chances against any single individual dying from hydrophobia are enormous, although decreasing yearly; but the disease itself is so hopelessly fatal, so terrible and unnatural as it were, that any reasonable proposition showing how its increase can be checked, should, I think, be put in a practical shape. The fifty or sixty annual deaths from so terrible a malady, have minor and yet serious significances, for they mean at the very least a large number of people bitten by rabid dogs, and therefore even to those who escape, much suspense, untold and unrecorded mental tension and agony; they mean a very extensive but unknown loss of valuable horses, cows, sheep, and other domestic animals, for most decidedly over a hundred of the lower animals die for every human death from this disease; they mean an immense quantity of fowls which get bitten, infected, and die, and lastly they mean the destruction of many valuable dogs, and whole packs of hounds either by the disease itself or destroyed as a precautionary measure.

The Present Epidemic.

Epidemics of zymotic maladies being simply the rapid growth and multiplication of pre-existing elements, it is not rigidly correct, to talk of the 'commencement' of an epidemic; using however, common language, the present outbreak commenced in Lancashire in 1869. This populous county indeed, situated in almost the geographical centre of the island, has been a focus of the infection for many years (see table); out of 334 deaths returned in the ten years ending December 31, 1876, no less than 110 or $\frac{1}{3}$ occurred in that county. From Lancashire it extended into the northern and midland counties of England, and from thence into Scotland, where it had not been seen for many years, reaching as far north as Aberdeen. (Its course in Scotland I have no materials for tracing; it does not appear to have caused any human fatality there until 1876, when a series of very sad cases of hydrophobia occurred in Glasgow.) In the midland and northern counties of England it was extremely virulent, and sportsmen will long remember the numbers of packs of valuable hounds which had to be destroyed; notably the Durham, Quorn, Albrighton, Essex, Braes of Derwent, and Lord Fitzwilliam's. From thence it appears to have extended in every direction, and this year has invaded Devonshire, where no fatal case in man has been known for forty years.

Hydrophobia in Devonshire.

There are very few records of local epidemics of hydrophobia in which any attempt has been made to trace the chain of infection from parish to parish, or from county to county. Such details are of the greatest practical value, often showing at once unforeseen dangers, and the direction that preventive measures should take. Such an inquiry is, however, surrounded with difficulties; much is hidden, from the nature of the thing, and more from individual reticence. With the most persistent watching and inquiry, and with the accident of an official position, giving me constant communication over a large portion of the county, I can only find here and there links of a chain, the rest of which must be pieced on supposition or probability. It came from the north-east; the first definite evidence of its existence I have is that some time in the month of January a rabid dog, wandering in a thicket in the neighbourhood of North Molton, a parish bordering on Exmoor, bit a gamekeeper, who, in the early part of May, died from hydrophobia. In the month of March, a strange dog entered by night the yard of a farmer in the same parish, tearing his way through considerable obstacles, and bit his sheep-dog. The sheep-dog went mad a month after the occurrence. These cases being all in the same neighbourhood may be, with the greatest probability, viewed as those of direct lineal succession. We may suppose that the solitary rabid dog imported it, and bit others in January; that the second series developed

in March, one of them biting the farmer's dog, and that the farmer's dog with others formed a third series, one of which at all events fructified in April, and was in a condition to inoculate a fourth series.* Directly we arrive at the fourth term in the progression, it is useless to attempt to trace the individual agents, and general statements must take the place of details. Without a doubt the third series, of only one of the members of which I have any record, was sufficiently numerous to infect a considerable extent of territory, for in April I traced it into the town of South Molton, and for a radius of four or five miles round that town; these belonged probably to a fourth or fifth series, and from these sprang a considerable number of rabid dogs, wandering about the county in every direction. In May it had appeared in Roborough, Honiton, Little Torrington, and North Lew; Exeter was early infected, and in its turn infected the surrounding country. In July a boy at Ashburton, a girl near Ottery St. Mary, and, in August, a child at Barnstaple were all severally bitten by rabid dogs, and have died since at different dates from hydrophobia. The epidemic has not been confined to dogs and men; it has been fatal, directly and indirectly, to a very large number of cattle, sheep, dogs, and pigs.

During the whole of this time, some authorities have used the powers they possessed of restricting the movements of dogs, others either refused to believe in the existence of hydrophobia or declined to take any action. The few boroughs and divisions which used their powers did so, according to their individual wisdom, the result being a number of regulations in different areas of very varying value, and since in other areas there were no restrictions at all, the result has been that very little control, if any, has been exercised on the propagation of the malady. At the present time, the infection has reached its height. I have notes of the existence of rabid dogs in every single division in Devonshire; it has gone from north to south, from east to west, and is at the present time not passing over, but extending to Cornwall.

There is one terrible feature of the present epidemic which is very palpable to my eyes, but with which perhaps every medical man may not agree, and that is that the virus appears itself to be more active than usual. In the older writers on hydrophobia one reads much of the efficacy of nitrate of silver, if applied to the wound even after some considerable time had elapsed. There were in existence veterinary surgeons of eminence who had been bitten by rabid dogs more than twenty times, and yet had escaped without injury; but in the recent medical records cases are detailed in which acid nitrate of mercury, strong solution of sulphate of copper, nitrate of silver, the actual cautery, and the like, have been applied even to the slightest wounds, and yet without avail. So I am bound to conclude that that unknown influence called 'epidemic' is now at work, and that all animals and men are more liable to the infection than formerly.

* The terrible harvest of hydrophobia is reaped in successive crops. In this county there appears to have been intervals in which no rabid animals were known to exist, viz., from January to the latter end of April, from about May 23 to middle of June, most of the early part of July, ten days in the early part of September, and twenty days of October. At the present date, October 25, there is an exacerbation, madness being reported in different parts of the county.

Preliminary Considerations with regard to the Prevention of the Disease.

Without a single doubt, the great difficulty that the legislator will experience in endeavouring to frame any comprehensive measure likely to be of real use is the long and uncertain period of incubation. If between the planting of the seed and its fearful harvest one short month always intervened, the matter would be tolerably simple, but here two, three, four, even six months, not to speak of longer exceptional periods, elapse before the explosion, as it were, of the symptoms, and during this dreary suspense there are no indications whatever of any kind of ill health—whatever process is going on, whether in the wound itself, or more *probably in the deep lymphatic vessels in its neighbourhood*—the whole is veiled from the eye of the most acute observer.* This period of incubation is then of the first importance; we have now a very large number of definite facts with regard to it, and it may at once be stated that Laforce, Roll, Youatt, Renault, St. Cyr, Fleming, and other eminent veterinarians all agree that in the dog, which is the chief propagating agent, periods of incubation extending beyond six months are extremely rare, that the average is from two to four months, and that exceptional instances do occur in which it may extend to fourteen or fifteen months.

But I, perhaps, ought to have first dealt with the question as to whether the disease ever arises spontaneously, or whether a dog perfectly healthy can give or produce hydrophobia in a man; for it is evident that if the answer to these important inquiries be in the affirmative, restrictions or measures of any kind short of wholesale canine destruction would be useless. The cruel experiments of the French savans have shown conclusively, that exposure however prolonged to heat or cold, hygienic conditions however bad, deprivation of water, of food, and infliction of the most ingenious tortures, all alike, in the absence of the specific zymad or germ, fail to produce rabies in the dog; and since on the one hand there is no record of a dog having become rabid under conditions which absolutely excluded contagion, whilst on the other the dogs of whole countries, the element of contagion wanting, continue free from the disease, I think it may be accepted that in our time it never develops spontaneously. That it must once have arisen I acknowledge; it is reasonable to suppose there was once 'an Adam' of every existing life-form, but the origin of complex or simple organisms is aliked wrapped in obscurity. There has been more doubt of late as to whether dogs under certain undefined conditions of excitement may induce, by their bite, hydrophobia; against the two or three loose facts reported in favour of this view, may be brought the statistics of Professor Pillwax† of the Vienna Veterinary Institution. He appears to have kept a register since 1848 of dogs, which had been brought to that institution, accused of having bitten people,

* We must not suppose that the virus enters into the blood, like the solution of an alkaloid injected subcutaneously. The long residence of the virus shows that it is localised, and undergoes some change; the probability that it really does reside in the deep lymphatics is strengthened by the remarkable sensations in a bitten limb, which so often precede for many hours the explosion of the malady. The direction which experiments on animals should, in my opinion, take, is the inoculation of the virus in their extremities, and the amputation of the entire limb at different periods of time.

† Fleming, 'Vet. Sanitary Science,' ii. 227.

and these dogs were admitted and watched for some time to see their state of health. The number of non-rabid animals amounted, in 1875, to more than 5,000, which means that nearly that number of people had been bitten, and yet not one of these had gone mad. There is no single experimenter who would not be satisfied with the negative result of 500 experiments, and I think we may fairly assume that one-tenth of the 5,000 were inoculated with the saliva of enraged, not rabid animals, and yet no results followed.

The general explanation of the statements to the contrary is a mistake in the dog which inflicts the wound; for example, there was apparently an undoubted case of a calf becoming rabid from the bite of a healthy dog, reported in the June number of the *Veterinary Journal*, 1876, but in the October number the writer contradicts his former statement, saying that the calf was really inoculated by a rabid dog so extremely like the healthy one that the error was easily made. The disease, then, neither arises spontaneously in the dog, nor does a healthy dog communicate it to others.

I have stated before, a fact generally admitted, that the dog is, practically speaking, the sole propagator; it is true, foxes are to be considered. A tame rabid fox once communicated the disease to an English nobleman; cats get bitten and infected, and sometimes do damage; horses, sheep, pigs, oxen, in this country die of hydrophobia, but seldom, perhaps never, communicate it to others. Stamp it out, if possible, in the dog, and in this country rabies would be unknown. The rabid dog, indeed, in most cases, as Delabere Blaine said,* acts with so much method that it seems to have an instinctive disposition to propagate the disease. 'In its early stages, before the strength is much impaired, dogs will travel immense distances under this impulse; such an one trots along, and industriously looks out for every dog within his reach or sight. Whenever he discovers one, little or large, he first smells to him in the usual way of dogs, and then immediately falls on him, generally giving him one shake only, after which he commonly sets off again in search of another object.'

This statement of Mr. Blaine's is, I believe, very near the truth. There is an erroneous idea prevalent that rabid dogs take their march in a straight line; if such were the case, the infection would not travel with that slowness, which it undoubtedly possesses, —for example it has taken six years to travel from Lancashire to Devon. Besides this I have careful notes of the wanderings of two rabid dogs, both of which did considerable damage in this county. The course of each traced upon the map is an irregular circle, with many bends and angles, the radius in no portion exceeding seven miles, and each dog returned once or twice to his home. The infected areas are thus formed of erratic curves, the transmission from which in different directions is never regular, for it is disturbed by the controlling efforts of authorities, the destruction of mad dogs by individuals, and the varying action of the dogs themselves, a few going straight and only snapping at things in their way, some being affected with dumb madness, some being early paralysed, and a minority wandering at once to some desolate spot and there dying without doing any injury.†

* 'Canine Pathology,' by Delabere Blaine, London, 1832, p. 128.

† One rabid dog may occasionally cause the death of several people, as actually happened near Ludwigs Haven, where a dog having, without any very marked symptoms of illness, broken its chain and wandered along the canal of the Rhine, bit, first a little boy, ten years old, in the right forearm, then a boy aged fifteen years, thirdly, a man, and lastly, a woman; of these four people, the woman alone escaped, her dress having protected her from an actual wound. In one of these cases also was observed premonitory symptoms for more than a week, and lancinating pains at the seat of injury.—*Wochenschrift für Thierheilkunde.*

Legislation with regard to Rabies.

The germ or the fruit of rabies lurking or existing in the whole of England and Scotland at the present time, the deaths of human beings each year on the increase, the present regulations are proved to have been inefficient, and indeed are popularly acknowledged to be so.

Urban Sanitary Authorities under the Towns' Police Clauses Act can of themselves make very efficient restrictions, they can enforce the confinement of dogs for a long period, and thus protect themselves from their own dogs; but it is obvious that the most repressive measures in a town will never prevent importations of infected dogs, if the surrounding district is not under equal restrictions.

The statute, however, passed on July 24, 1872, called the 'Dogs Act,' is the only one that can be put generally in use. This 'Dogs Act' was evidently framed to deal with two very different things, viz., a dog savage and dangerous, but not mad, and a dog actually mad. In the first case the Act states (sec. 1) that a constable may take possession of any dog supposed to be savage or dangerous straying on the highway, and not under the control of any person, and may detain such dog until the owner has claimed the same, and paid all expenses incurred by reason of such detention; if not claimed within three days he may be destroyed. It is evident that under this section, which provides for no veterinary or skilled examination of a stray dog, the police might take charge of a rabid animal, to their own personal danger, and deliver him up to the owner, neither police nor owner being aware of the dog's state, and directly the transfer was effected the brute would probably escape, and resume his tour of destruction.

In the second case, viz. actual madness, it is enacted (sec. 3) that 'the local authority may, if a mad dog, or a dog suspected of being mad, is found within their jurisdiction, make, and when made vary or revoke, an order, placing such restrictions as they think expedient on all dogs not being under the control of any person, during such period as may be prescribed in such order throughout the whole of their jurisdiction, or such part thereof as may be prescribed in such order.' The local authority—meaning in London the Commissioners of Police, in boroughs, whether in England, Scotland, or Ireland, the town councils, or the bodies analogous to them, and lastly the justices in petty sessions—in other words various local authorities of very various capacities, of very various knowledge and power of acquiring knowledge, acting perfectly distinctly and independently over various distinct and independent areas, have the power either to make regulations or to leave them alone.

It appears to me that the framers of the Act had in view single mad animals—the expression '*a* mad dog' shows that they viewed them as rarities and curiosities—and did not appear to imagine an epidemic probable or possible. But the most sarcastic and bitter commentary on the working of

this Act is to be read in the number of coroners' inquests, and in the cases of hydrophobia detailed in the medical papers. It is not alone useless and inefficient, but being so the restrictions imposed by it are vexatious, and the only possible way to work it usefully is for the various authorities in a county to form a voluntary association and work in concert. This, until a new and better Act is framed, is certainly possible, and would give better results.

A fatal disease, carried night and day in the mouths of the sheep-dog, the terrier, and the greyhound, defying boundaries, leaping over obstacles, obeying no rules, and respecting no sanitary precautions, cannot be stayed by petty regulations, carried out in petty and scattered areas of jurisdiction. An Act of Parliament for the prevention of hydrophobia must be put in force imperially over the whole of England and Scotland.

I have already stated that it is generally allowed that it is a really rare thing for the period of incubation to exceed six months, and also that if the disease is decreased in the dog a very great step towards its extinction in this island altogether is gained.

It then necessarily follows that if there should be passed a stringent Act, extending over six months, enacting: (1) that during that period all dogs should be confined, or if let out they must be led by a string, muzzled with a wire muzzle of approved construction, and provided with a collar having the name and address of the owner; (2) that during this period, even when confined, they must wear a collar, having the owner's name and address legibly engraved on it; (3) that the police finding a dog straying and provided with a labelled collar or other means of ascertaining his owner, shall, if possible to do so, and the dog is not apparently either dangerous or rabid, convey the animal to a place of detention, have the dog examined by a veterinary surgeon, and return him to the owner, if pronounced healthy, on payment by the owner of a small fine and expenses; (4) a dog straying during the time specified without a collar shall be destroyed by the police; (5) a dog straying apparently dangerous or rabid shall be destroyed by the police, or may be destroyed by anyone, whether the dog is provided with an addressed collar or not. If such an Act, I say, should be passed, we should hear but very little of rabies for the next forty or fifty years. At the end of that period, it might possibly be re-enacted for another six months if there were any sign of its reappearance. To my mind it is certain the government of this country can avert all danger of any of us dying so terrible a death as hydrophobia by passing, at long intervals of time, *a stringent Act extending for short intervals of time over all England and Scotland.* That it would entirely stamp out the disease is possible but not probable; there is the danger of travellers bringing dogs with them from the continent which may have been inoculated there; there are the few cases of rabies which do undoubtedly occur extending over the six months' incubation, and some accidents might arise from madness lurking among foxes. All these considerations combined render the reappearance of the disease after a while likely, but that many hundreds of lives would be saved, I myself have no doubt whatever. The inconvenience to the farmer and to the sportsman during the six months' activity of such a statute is manifest; but if the farmer has not yet suffered extensively, he has had some loss, and there is a probability of that loss not diminishing but increasing, while the sportsman will long remember the destruction of so many valuable packs of hounds during the past two or three years, and both will or should consider human life as the first and most important question, and both would probably find in practice a really effectual measure lasting only six months less harassing than the sudden spasmodic, perhaps unexpected, action of a local authority.

In the case of packs of hounds, indeed, it would become a question whether an exception (providing they had during that period veterinary supervision), might not be made, supposing all other dogs were restrained. It is evident, if none of the pack had been inoculated previous to the Act, none of them would go rabid, and consequently not infect others; while in any other case the whole pack would probably have to be destroyed.

Certain it is, that we have to accuse as the main propagator of rabies not the high-bred and more expensive dogs, but the shepherd's dogs, the poacher's, and especially the mongrel curs, veritable canine arabs, prowling about the streets day and night. Many people appear to imagine that the higher bred dogs have some special immunity from madness, and much nonsense has been talked upon the subject. The fact of it is, that those dogs which during the night and a great part of the day are locked up in kennels, walled yards or houses, are not so likely to be inoculated by a mad dog on the trot, as the lazy brute lying in the gutter, at the corner of the street, or as the uncared-for dog roaming half the night over the fields.

Since the increase of rabies has fairly coincided with the increase of the lower class of curs loitering about streets, etc., and giving ample material for the propagation of the malady, and since this increase is directly dependent upon the encouragement given to breeding dogs by the lowering of the dog tax in 1867, it is generally admitted that the present dog tax could be raised with advantage to 12*s.* or 15*s.*, and more provision should be made that this tax should not be evaded. In this case it should be looked upon not entirely as a means of revenue but as a politic act preventing the too great increase of the canine race. In England and Scotland there are more than a million dogs, and reckoning their food at 1*d.* a day, they eat annually over 4,000*l.* worth, so that they might be decreased with advantage.

Mr. Fleming, the author of the best work on rabies in any language, has laid great stress on the 'vulgarisation' of a knowledge of the disease and its symptoms, and proposes to provide each dog-owner with the symptoms of the disease on the back of the tax papers. This suggestion has been adopted in France, and I think it would be a good thing if carried out here. Not too much, however, must be expected from it. During the present epidemic I have numerous notes of cases in which the owners*

* One of the most extraordinary cases of the incapacity of people to properly interpret symptoms is contained in an article in a recent number of the *Lancet*, by Sir William Smart, in which he relates how a rabid dog, under five days' continual observation by the surgeons, officers, and crew of a ship, was considered distempered:—'He became snappish, running round the deck, picking up straws, coals, etc. He attacked a sheep, bit at ducks and fowls (taking off the head of one of these) and snapped at his friends. He was then tied up and remained quiet when covered with a sail, but if exposed he would start up suddenly, and try to break his tether, howling piteously, beginning his cries with a barking noise. Medicines were given by the mouth and by injection. He allowed the coxswain

knew very well indeed the book-symptoms of rabies, but either from want of observation or from want of proper interpretation of what they saw, their dogs have bolted, and disappeared—the owners of a very large number of curs are often the poorest, densest, and least educated of the population; and even when madness is about and their attention directed to the subject, wilfully or negligently mistake the most evident symptoms. The prodromata of rabies after all are frequently obscure; there are few veterinary surgeons, even of great experience, who would give a definite opinion at the only stage of the disease when there is a chance of restraint.

to administer the remedies and to fondle him, but at last bit him also. He was put into the boat astern, and covered with a sail. He vomited at times and returned to it; he took no food for days and it is doubtful whether he drank anything; and latterly there was a ropy slaver at the corners of his mouth. He became emaciated and died at night, being found dead in the morning, after about five days' illness.'

Table Showing the Number of Deaths from Hydrophobia in each County in England and Wales, 1866–1875, as well as the Number of Licenses Granted for Dogs.—[Compiled from Parliamentary Paper 163.]

Years	1866	1867	1868	1869	1870	1871	1872	1873	1874	1875	1876	Total of the ten years, 1866–75
Number of Licenses granted for Dogs		730,384	801,487	892,252	944,496	997,322	1,005,823	1,040,630	1,109,977	1,153,616	1,209,490	
1. LONDON.												
Middlesex, part of	10	1	—	—	—	1	1	1	6	3		23
Surrey, part of	1	2	—	3	—	—	—	—	3	3		12
Kent, part of	—	—	—	—	—	—	—	—	—	—		—
2. SOUTH-EASTERN COUNTIES.												
Surrey, part of	—	—	—	—	—	—	—	—	2	1		3
Kent, part of	1	—	1	—	—	—	—	—	1	—		3
Sussex, part of	—	—	—	—	—	—	—	—	2	—		2
Hampshire	1	—	—	—	—	—	—	—	—	—		1
Berkshire	—	—	—	—	—	—	—	—	—	—		—
3. SOUTH-MIDLAND COUNTIES.												
Middlesex, part of	—	—	—	—	—	—	—	—	1	—		1
Hertfordshire	—	—	—	—	—	—	—	—	—	—		—
Buckinghamshire	2	1	—	—	—	—	—	—	—	—		3
Oxfordshire	—	—	—	—	—	1	—	—	—	—		1
Northamptonshire	—	—	—	—	—	—	—	—	—	—		—
Huntingdonshire	—	—	—	—	—	—	—	—	—	—		—
Bedfordshire	—	—	—	—	—	—	—	—	—	—		—
Cambridgeshire	—	—	1	—	—	—	—	—	—	—		1
4. EASTERN COUNTIES.												
Essex	—	—	—	—	—	—	—	—	1	1		2
Suffolk	—	—	—	—	—	—	—	—	—	—		—
Norfolk	—	—	—	—	—	—	—	—	—	—		—
5. SOUTH-WESTERN COUNTIES.												
Wiltshire	—	—	—	—	—	—	—	—	—	—	Returns not yet published.	—
Dorsetshire	—	—	—	—	—	—	—	—	—	—		—
Devonshire	—	—	—	—	—	—	—	—	—	—		—
Cornwall	—	—	—	—	—	—	—	—	—	—		—
Somersetshire	—	—	—	—	—	—	—	—	—	—		—
6. WEST MIDLAND COUNTIES.												
Gloucestershire	—	—	—	—	—	—	—	—	—	—		—
Herefordshire	—	—	—	—	—	—	—	—	—	—		—
Shropshire	—	—	—	—	—	—	1	2	2	—		5
Staffordshire	1	—	—	—	—	3	5	2	4	5		20
Worcestershire	—	—	—	—	—	—	1	—	—	1		2
Warwickshire	—	—	—	—	—	—	1	1	1	1		4
7. NORTH MIDLAND COUNTIES.												
Leicestershire	1	—	—	—	—	—	1	—	—	1		3
Rutlandshire	—	1	—	—	—	—	—	—	—	—		1
Lincolnshire	—	—	—	—	—	—	—	—	—	—		—
Nottinghamshire	—	—	—	—	3	3	3	—	2	3		14*
Derbyshire	—	—	—	—	1	2	—	1	2	1		7
8. NORTH-WESTERN COUNTIES.												
Cheshire	1	—	—	1	2	3	—	1	2	1		11
Lancashire	13	2	—	5	10	19	16	14	15	16		110
9. YORKSHIRE.												
West Riding	—	—	5	7	9	15	5	1	12	8		62
East Riding (with York)	—	—	—	—	—	—	—	1	3	2		6
North Riding	—	—	—	—	1	1	1	—	—	—		3
10. NORTHERN COUNTIES.												
Durham	2	1	—	2	4	5	4	1	1	—		20
Northumberland	3	2	—	—	1	1	—	3	1	1		12
Cumberland	—	—	—	—	1	—	—	—	—	—		1
Westmoreland	—	—	—	—	—	—	—	—	—	—		—
11. MONMOUTHSHIRE.												
South Wales	—	—	—	—	—	1	—	—	—	—		1
North Wales	—	—	—	—	—	1	—	—	—	—		1
Total	36	10	7	18	32	56	39	28	61	48†		335‡

* The Parliamentary return has 13. † The Parliamentary return has 47.
‡ The Parliamentary return has 334. All the above are evidently arithmetical errors.

METROPOLITAN PURE SEA-WATER SUPPLY.

III.

THIS is an age of rapid strides in every imaginable art, science, and mechanical appliance for the benefit of mankind, and consequently it must not be said that it was found impossible to introduce a pure sea-water supply into our dwellings, bringing with it a vast store of health, when the necessary outlay, no matter how great, can be clearly proved to be remunerative. The fact that the water must be pumped to a great height (500 feet) to afford a gravitation supply to all London, need not militate against its comparatively economical introduction. The great distance of London from a pure source increases the cost more than the actual height to which the water must be raised, as well as rendering necessary a still greater elevation for the necessary flow. If the cost of pumping amounts to 3*d.* per 1,000 gallons for 500 feet high, that of delivery, including maintenance of every description, and a competent staff of officers will amount to much more, as must be quite evident, seeing that the selling price is justly put down at an average rate of 2*s.* 6*d.* per 1,000 gallons. Should the consumption reach the capacity of the pipes throughout their entire length (7,000,000 gallons daily), the average price might be advantageously reduced to 2*s.* per 1,000 gallons, which would be thought a very moderate price taking into consideration that the original outlay will prove so heavy.

The whole subject hinges more on the question, will it pay? than will it certainly vastly increase the health of London? There is no doubt about the answer to the latter. Everyone who knows anything of the curative properties of sea-air and sea-water understands that their presence in our houses under great pressure always ready for use, would be an incalculable boon. It is proposed now to give a few figures, the result of a considerable amount of careful calculation, showing what the remunerative character of this undertaking would be. We will assume the expenditure at one and a-half millions sterling as already stated in Article II.—1,500,000.

The total annual income on the above expenditure of capital is anticipated to be as follows after full demand for the sea-water has been reached in the country and London, but still leaving a margin of 2,000,000 gallons daily, viz.:

Water 1,825,000,000 gals. at 2*s.* 6*d.* per 1,000	£228,125	
Rent of 60,000 meters at 6*s.*	18,000	
Total income		246,125
Annual Expenditure.		
Fuel	£16,060	
Oil, tallow, waste, etc.	1,200	
Repairs to engines, pumps, etc.	4,000	
Do. (5 p. c.) to reservoir, mains, etc.	50,000	
Contingencies	7,100	
Salaries of officials	7,500	
Total expenditure		85,860
Annual nett income		£160,265

The above would be equivalent to about 10 per cent., but as the items of fuel and repairs to reservoir and mains are purposely overstated, I believe that the nett income would be nearer 200,000*l.*, and the price of the supply might, therefore, be reduced from this cause, and also because of a greater eventual consumption than 5,000,000 gallons daily without adding more than about 3*d.* per 1,000 gallons to the cost of obtaining it. The expenditure in the foregoing statement amounts to about 28 per cent. of the income, and may be safely set down as more than ample for the purpose of maintaining a daily supply of 5,000,000 gallons of sea-water to London and the intervening country between it and Lancing. In a financial point of view this great project for the benefit of London and the improvement of its general sanitary condition may be looked upon as a great future success, returning not less than 10 per cent. profit after reaching full working order and maximum supply. It is quite true that from the time of entering upon the undertaking until its completion, about three years would elapse occupied in works of construction at the seaside, and in laying mains and services over some hundreds of miles, and the capital during that period would be lying unremunerative, yet the eventual profit would be so great and so certain, that it would pay handsomely to wait for it. This is a case in which the organisation of the Metropolitan Board of Works and their facilities for obtaining money at low rates would to a certain extent not feel the want of revenue until the completion of the works so much as a private company. This great sanitary authority could undertake and execute this grand project for conveying a daily blessing to London more economically and more readily than any private organisation, no matter how well conducted, and could manage the distribution with greater effect for the general welfare of this gigantic metropolis. It must be always matter for deep consideration in entering upon this subject, how it can best be economically accomplished and afterwards administered, and it may be unhesitatingly answered that the Metropolitan Board of Works contains within itself the means for attaining both ends. Economical construction with strength and cheap administration, would go far to fill in the want of income for the first three years. No expenditure ever undertaken by them will give a better return in increased general health, and a handsome revenue on a great outlay undertaken through beneficial and sanitary motives will certainly accrue. They might find indeed, in time, that the rate could be reduced still lower than 2*s.* per thousand gallons, after the total consumption in town and country had increased to 7,000,000 gallons daily, and that would be the means of lowering the rates at the public baths to a slight extent, as well as proving more economical to the householder, thus virtually benefiting all partaking of the supply. Considering the price that must be paid for pure sea-water by the Westminster Aquarium Company, one can hardly see how the maintenance of the necessary quantity can be accomplished now at a profit. But when the price of pure sea-water is reduced from about 3*d.* per gallon to 2*s.* 6*d.* per thousand gallons, prosperity will not only attend the Westminster institution, but many others on a minor scale throughout London. The subject is a very interesting and instructive one, and the wonders of creation, as exemplified in the habits of the smaller inhabitants of the deep, may be witnessed yet in numerous places in our metropolis, through the introduction of a plentiful supply of pure sea-water at economical rates.

In providing a supply of pure drinking water in addition to the existing supply of water from the various metropolitan companies, there will always

be great difficulties to contend with in having duplicate pipes and other necessary appliances on a gigantic scale, necessarily embracing all London. The advantages to be reaped will hardly justify so great an outlay as five to six millions sterling, when it is remembered that it is always possible, by adequate pressure put on the different companies, to greatly improve the quality of the water supplied by proper filtration at a comparatively small outlay to them. But the introduction of another set of mains and services for supplying pure sea-water will not appear so incongruous, seeing that they are intended solely for maintaining a supply for bathing purposes, and unlikely to be used for any other purpose. One supply of good fresh water and another of pure sea-water in the same house would prove much more beneficial than two supplies of the same kind of water of different degrees of purity. The Metropolitan Board would do well to use the ample power conferred upon them to compel all the water companies to supply well-filtered water to every house in London before entertaining any scheme for the introduction of a limited supply for drinking and fire-quenching purposes. This journal has already (September 23, 1877) put forward valid objections to the introduction of another general fresh water-supply, which cannot be well got over. The enormous outlay necessary is without doubt much underestimated at 5,500,000*l.*, and once entered upon, the project must be completed if the estimated cost were to be doubled. Far better employ every legitimate means of compulsion against the companies to improve the existing supply at a very small outlay to them, and not costing the public a farthing, than enter upon the utopian scheme of a duplicate fresh water-supply. With two supplies of fresh water already in the house, there would be no room for a pure sea-water general supply at a moderate outlay as well, thus destroying a certain benefit for the sake of a very dubious one accomplished only after an excessive expenditure of capital. To introduce a new supply of pure drinking water would be releasing the water companies from enormous responsibility at great cost to the ratepayers, and without any adequate return for the immense outlay; and should the new supply at any time fail, the entire public would have to depend upon the impure water supplied by the companies without any filtration, being intended only for ordinary purposes. In fact, the more the matter is studied, the more disagreeable and unwise in conception does it appear. S. M'B.

THE New River Water Company are still engaged in sinking a well into the chalk formation at Turnford. To provide for the increasing demands of their district, the company are making several important additions to their distributory works, to effect separation of the different levels of their service into convenient zones, and to add to the power and means of communication by which their different stations are enabled to assist one another. The new works at Hornsey include five new filtering beds, of a joint area of 3½ acres, four new powerful engines, a new high service reservoir on Crouch Hill, capable of holding twelve millions of gallons, and about thirteen miles of large mains to be laid down as lines of communication between the works just described, and for connections with existing pipes. The filtering beds are finished, and the construction of the reservoir, engines, and buildings is progressing rapidly. The company are prepared to give constant supply when called upon to do so by the public authorities.

THE
SANITARY RECORD.
FRIDAY, NOVEMBER 2, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

THE COMPULSORY NOTIFICATION OF INFECTIOUS DISEASE.—A NEW STEP.

A VERY important movement in the direction of promoting a general law for the compulsory notification of cases of infectious disease has lately been made by the urban sanitary authority of Bolton. In an Improvement Act, which the authority obtained last session, very effective powers have been obtained for compelling not only householders but also medical practitioners to give immediate notice to the corporation of any case of infectious disease which may occur in their households or practice. We have printed in pages 287–88, at length, the section of the Act, which gives these powers, in order that our readers may have before them the precise wording of this local statute. One, if not more, attempts, have, we believe, been previously made by other corporations to obtain similar provisions in local bills which were promoted by them, but, so far as we are aware, this is the first case in which such an enactment has been actually made. The corporation of Bolton, therefore, deserve every credit for their action in this matter, and for having thus initiated an experiment the importance of which in a sanitary point of view can scarcely be overestimated.

It will be seen that both the householder, or the person in charge of the sick person, and the medical practitioner who may be attending on him, are separately required to send notice to the sanitary authority 'forthwith' on their becoming aware of the nature of the disease; and in order to further and facilitate the co-operation of the medical profession in this arrangement, forms of certificate are to be supplied to them by the Corporation, and the latter body also undertake to pay to every medical man who shall give such certificate the sum of 2*s.* 6*d.* for each such declaration. It must be confessed that this is a very satisfactory arrangement, and we trust that the Corporation will have no need to enforce, at any rate against any member of the medical profession, the clause which threatens a penalty not exceeding 10*l.* against any person who offends against this enactment. There can be no question here of any violation by medical men of the interests or privacy of their patients, since the patient, or his friends, is

compelled to give the same information on his own account. We must confess that this double system of notification to the sanitary authority appears to us to serve no particular object, and to involve some unnecessary trouble. It would, we think, have answered every purpose if the medical attendant had been required to give formal notice to the occupier of the house as to the nature of the disease, and if the duty of sending this notice to the sanitary authority had been delegated to the latter alone. However, as the doctor will receive half-a-crown for his trouble, we presume that he will not make much difficulty about forwarding the certificate to the sanitary authority direct.

We have now, therefore, for the first time got the Legislature to sanction the principle of compulsory notification, and to make it a part of the statute law of the land, though its application is at present confined to the town of Bolton alone. This is what may be called the thin end of the wedge. As our readers are probably aware, many of the provisions which are now applicable to the whole country in the Public Health and other Acts were at first sanctioned by Parliament in a tentative sort of manner in Acts of a purely local character. And it is well that this should be so. Sanitary legislation is in so large a degree an experimental matter that it is very desirable that any problems which involve doubt as to their practical operation should be worked out by local authorities who have sufficient spirit and intelligence to give them a fair trial before they are made compulsory on the mass of the people. We shall look with interest to see how this new enactment works in Bolton, for it cannot be denied that if, from want of tact or vigour in enforcing it, it should in any respect prove a failure, a heavy discouragement will be given to the advocates of sanitary progress, who have made the compulsory notification of infectious disease one of their leading war-cries.

Notes of the Week.

THE Town Council of Aberavon, Glamorganshire, have adopted the plans of Mr. Waring, C.E., for their new waterworks.

PREMISES are being fitted up and altered in Goat Lane, Swansea, for the reception of the free public library. Mr. David Morgan is the contractor.

THE rural sanitary authority for Dungarvan, county Waterford, have adopted plans by Mr. Frazer for a water-supply for Villierstown.

THERE were ninety-one applicants for appointment as Surveyor to the corporation and urban sanitary authority of Stockton-on-Tees, at 300*l.* per annum.

THE town council of Leicester have decided, by a majority of thirty-three to two, to purchase the waterworks upon the terms which, after discussion and negotiation, had been embodied in a draft agreement.

IN consequence of the prevalence of hydrophobia, the borough and county magistrates of Bideford have issued orders prohibiting persons from allowing their dogs to be at large.

THE Abergavenny improvement commissioners and urban sanitary authority have presented Mr. Isaacs, the chairman, with a life-size portrait of himself, in recognition of his valuable services to the board and to the town.

AT the last meeting of the Town Council of Cambridge, the following resolution was passed: 'That this council regrets the loss the town has sustained by the death of Mr. Richard Apjohn, their very able analyst.'

ALDERMAN WILLIAMSON, of Lancaster, has asked the corporation to sell him about forty acres of Lancaster Moor, on which he undertakes to lay out 10,000*l.* to convert it into a public park.

THE Newry Board of Guardians have, with a view to the preservation of the beach at Warrenpoint, Ireland, for bathing purposes, instructed Mr. Bailey Denton, C.E., to visit the locality and advise them as to the disposal of the sewage of the place.

THE following have been elected the first Local Board and Urban Sanitary Authority at Wirksworth, Derbyshire, namely, Messrs. William Shaw, Philip Hubbersty, Thomas Newton, Benjamin Street, G. H. Wheatcroft, Thomas W. Hunt, W. H. Watterson, Richard Wall, and John S. Hall.

MR. W. J. SELL, B.A., of Christ's College, Cambridge, for ten years principal assistant to the Professor of Chemistry and Demonstrator of Chemistry in the University, is a candidate for appointment as public analyst for Cambridge, Cambridgeshire, Huntingdonshire, and the Isle of Ely, vice Apjohn, deceased.

THE following have been elected the first local board and urban sanitary authority at Huyton-cum-Roby, Lancashire, viz., Messrs. W. Gore Ashton, Richard Brown, William Orme Carter, Charles Cooper, Thomas Dobell, J. W. Earle, Alexander Eccles, Edward Hughes, G. F. Ihler, John Jowett, James Steel, and John Westmoreland.

MR. ROBERT JONES, the chairman of the Carnarvon guardians and rural sanitary authority, has been presented by the guardians and other officers, and some of the principal ratepayers, at the Guildhall, Carnarvon, with an oil painting of himself and his wife, as a testimonial of their admiration of the faithful and efficient manner in which he had for many years presided over the meetings of the board.

MR. JAMES PICK, the late clerk to the Nantwich guardians and rural sanitary authority, has been presented with a purse of 100 guineas and a black marble clock, having a gilded plate inscribed, 'Presented, with a purse of one hundred guineas, to Mr. James Pick, on his retirement as Clerk to the Nantwich Board of Guardians, by the members of the board and other ratepayers in the various townships of the union, as a recognition for his devoted services of forty years, September 29, 1877.'

A BEER retailer and grocer named Dean, of Brandon Road, Brixton, was summoned to the Lambeth Police Court yesterday for having on his premises a quantity of treacle intended to be used as a substitute for malt. On behalf of the Excise, who prosecuted, it was stated that treacle was used sometimes by beer retailers to give fulness and a head to ale and stout, but it was a serious offence against the law. The magistrates fined the defendant the mitigated penalty of 50*l.*

THE Saltley Local Board and Urban Sanitary Authority, Warwickshire, have increased the salary of their clerk, Mr. Digby Jenkins, 20*l.* per annum.

THE Middlesborough Guardians and Rural Sanitary Authority have been invested with urban powers within the contributory place of Thornaby.

THE Toxteth Guardians, a great part of whose district is within the municipal boundary of Liverpool, and abounds in 'rookeries,' which are hotbeds of drunkenness, disease, and crime, have passed resolutions approving of the proposed purchase by the corporation of unhealthy dwellings in the township under the Artisans' Dwellings Act, and requesting the corporation to insert in their leases a clause prohibiting public-houses in any part of the cleared areas.

MR. NATHAN JOWETT, clerk to the Idle Local Board and Urban Sanitary Authority, clerk to the Windhill Local Board and Urban Sanitary Authority, and assistant overseer for the township of Idle, and who was assistant overseer for the township of Bolton for about twenty years prior to its annexation to the Bradford Union, has been presented by the inhabitants of the town of Idle and the neighbourhood with an illuminated address, a gold watch and guard, and a purse containing 72*l.* 14*s.*, in recognition of the faithfulness and integrity with which he had discharged the duties of the several offices, and of the valuable services he had rendered to the town. The Windhill Local Board have also increased his salary as Clerk from 25*l.* to 50*l.* per annum.

THE FRENCH SOCIETY OF HYGIENE.

THE French Society of Hygiene has lately held its first monthly meeting at the Hôtel de la Société d'Encouragement, under the presidency of M. Chevalier, the eminent hygienist. M. Pietra Santa, the secretary, announced that the number of registered members of the new institution, modelled on the English pattern, amounted to more than 300. A letter from the Sanitary Institute announced that the Société d'Hygiène had taken a diploma of honour at the Leamington Exhibition.

THE SCARBOROUGH WATERWORKS AND THE CORPORATION.

A SPECIAL meeting of the Scarboro' Town Council is convened for Monday, the 29th inst., to consider the propriety of purchasing the Water Company, and appointing a committee to prepare a bill for the transfer, by agreement or compulsory purchase, of the waterworks. It will be remembered that we published an analysis of this water company's water in our issue of the 5th inst., and that the supply, although it had a slight astringent taste, was on the whole satisfactory.

COLLIERY GASES.

THE technicalities and provincialisms in common use among colliers in the various mining districts, are of a curious and somewhat puzzling character to the general reader. If all of them indeed were collected, they would form a very lengthy list, and their retention upon the memory would be found next to an impossibility. We may instance a few terms often met with in reference to colliery disasters, and which may be taken as a fair example of many others: 'Fire-damp,' 'damp,' 'fire,' and 'hydrogen,' are all synonyms, and mean carburetted hydrogen, either pure (strong), or mixed with atmospheric air. Again, 'choke-damp,' 'after-damp,' and 'stythe,' all denote carbonic acid, watery vapour, and nitrogen, resulting from the violent combustion or 'explosion' of carburetted hydrogen. 'Dampie,' 'black-damp,' 'white-damp,' and 'damp' each represent the same thing, namely, carbonic acid, which is emitted from the coal in places wherefrom coal has been previously got—in fact from old workings.

POISONOUS PIGMENTS.

SOME parliamentary regulation of the use of poisonous arsenical pigments appears to be certainly called for. We have published from time to time in these columns, a great many records of cases of slow arsenical poisoning from the deleterious influence of paper hangings coloured with arsenical pigments, and of dresses died with arsenical colours. Dr. Fergus, of Marlborough, now puts on record a case of a child, five years old, apparently suffering from symptoms of arsenical poisoning, in whose case the toxic influence was due to playing with and possibly licking a set of green counters used in the game of Go-Bang, and, as is commonly the case with such coloured toys, thickly painted with arsenical pigment. The use of poisonous pigments are by no means necessary, and could easily be avoided; but probably reform can only be brought about by legislative enactment.

CAMP MILK.

WE are glad to hear that some inquiries are being carried out as to the best kinds of bread for use in camps. Meantime it would be perhaps well and easier for the authorities to arrange that soldiers and their wives and children shall be supplied with pure milk instead of the watered, skimmed, and adulterated article, which is largely imposed upon them. Some short time since inquiry was made in the matter at Aldershot at the instance of the principal medical officer, and the result was to prove that a large quantity of the milk supplied was shamefully deteriorated and impoverished by skimming and watering. This inquiry was carried out at the instance of Surgeon-General McKinnon, and without expense to the authorities, and the results were placed at their disposal. We have no reason to believe, however, that any permanent improvement has resulted, although enough has transpired to show that this serious deterioration of one of the most necessary articles of diet is carried out not altogether without complicity of some of those persons whose duty it is especially to guard the soldier against such frauds.

OPEN SPACES IN DUBLIN.—THE SCIENCE AND ART DEPARTMENT.

SOME of our readers may have seen, when visiting Dublin, a considerable open space, called Leinster Lawn, situated to the west of Merrion Square. This space has for several years been laid out as a public garden, under the charge of the Royal Dublin Society. This garden, together with Merrion Square, forms one of the finest open spaces to be met with in the heart of a great city. The Science and Art Department has lately made arrangements for letting out the property of the Royal Dublin Society, and founding an Irish South Kensington thereon. The foundation of such an institution will be greatly for the benefit of Dublin and Ireland, but we must express our surprise and indignation that a 'Science' and 'Art' Department should propose to build upon and close up Leinster Lawn. Yet such a proposal has really been made, and will almost certainly be carried out, unless public opinion is loudly expressed against such a piece of unscientific and unartistic thoughtlessness. It seems rather anomalous that, while a private citizen of Dublin should have made arrangements with the Dublin Corporation, Government, and Parliament for the purchase and maintenance of St. Stephen's Green as a public park, that the Government should be destroying a public garden barely half a mile off. We hear that Lord Pembroke, the lord of the soil, can intervene and prevent building on Leinster Lawn. If this be so, we trust he will exercise his right, and prevent this piece of vandalism. Dublin would be better without an additional museum than without its pretty garden in Leinster Lawn. We know that there is plenty of building ground to be had in Kildare Street, which will answer the Science and Art Department equally well.

THE WATER-SUPPLY OF OXFORD.

THE new reservoir, situate at the top of Headington Hill, to supply the University and City of Oxford with water, was formally opened on the 26th ult. by the chairman of the Waterworks Committee, Mr. John Galpin, in the presence of the Mayor and Corporation and a distinguished company. The new reservoir has been built from the plans of Messrs. L. and C. Hawksley by Mr. Dickinson. The reservoir will contain a million and a-half gallons of water, which will be supplied from the lake at Oxford. The pressure from the new service will be so great that in case of fire a copious supply of water can be produced to reach the highest tower in Oxford.

POPLAR COW-HOUSES.

AT a recent meeting of the Poplar Board of Works, the medical officer complained that several of the cow-houses licensed by the board were in a filthy condition. The hides of the cows, extending to the teats, were in some instances caked with dung, and the milk-pails were very dirty. He had spoken to one proprietor about the importance of keeping the cow-house cleaner, but his suggestions were lightly treated. He therefore recommended the board to insist on greater cleanliness, or withhold licenses. The connection so often proved between impure milk and the spread of infectious disease would, we should have thought, been sufficiently well known to prevent the existence of the state of things here disclosed. It is satisfactory, however, to find the medical officer of health exercising a proper vigilance in the inspection of these metropolitan cow-houses, which might otherwise become active foci of disease.

SKELMERSDALE SEWERAGE.

IT is satisfactory to be able to report that this question is now finally closed. The official sanction of the Local Government Board to the scheme prepared by Mr. G. Henry Roberts, C.E., of Preston, was received by the Clerk to the Skelmersdale Local Board at the end of last week, and the contract for the execution of the works will be let at once, and it is expected that by next Midsummer day the sewerage of the township will be completed. Mr. Roberts may be congratulated upon the success which has attended his labours in this matter. The local board, it will be remembered, had a sewerage scheme before them for the township which was estimated to cost 11,000*l.*, but Mr. Roberts, who had devoted many years to the solution of this sewage difficulty, brought his scheme under their notice, and after much opposition he was instructed to prepare a scheme, and last October it was decided to carry it out. This scheme was estimated to cost under 4,000*l.*, but many difficulties had to be encountered before it could be adopted. It had to be sent to the office of the Local Government Board, in London, where it encountered some obstruction, but from what cause it is rather difficult to say. After six months' waiting, however, their sanction has now been received. Mr. Roberts's scheme consists in draining the township in the usual manner, by earthenware pipe drains, laid deep enough to drain all the cellars, and the sewage is collected to one outlet (Mr. Roberts was instructed to use only one outlet at Skelmersdale), where some eight acres of land have been leased by the local board, on which the sewage will be purified before being discharged into the River Tawd.

SANITARY MATTERS AT SIDMOUTH.

MR. J. N. RADCLIFFE, one of the Local Government Board inspectors, recently held an inquiry into the sanitary condition of Sidmouth, and the result of the investigations and his recommendations has been communicated to the local authorities. In the first place, Mr. Radcliffe recommends the provision of a hospital for the isolation of cases of infectious disease, together with the provision of a mortuary, and the making of an arrangement with the registrar of births and deaths to give to the medical officer of health immediate notice of deaths registered from infectious diseases in the district, in addition to the monthly return of all deaths and causes of death. The sewerage of the town should be completed without delay, and the existing sewers should be subjected to careful examination with a view to ascertain the efficiency of their working. Ample provision should be made for the ventilation of all sewers, proper arrangement established for flushing them, and systematic measures adopted for rectifying, under competent supervision, the imperfect drainage of premises. As the augmentation of the trustees' supply so as to admit of the general distribution of their water throughout the town is remote, public fountains—or rather 'taps'—should be established in those parts of the town where the water-supply is most deficient or where it is impure. Measures should at once be taken for abolishing all foul cesspits and cesspit privies, and a common plan of disposal should be adopted within the sewered area, with a careful and frequent systematic inspection by the local board officers to prevent pollutions of the water-supply. Explicit instructions are given as to the course to be pursued with regard to closets, suggestions are made with regard to slaughter-houses and pigsties, and the inspector then proceeds:—'With respect to other nuisances and unwholesome conditions, such, for example, as relate to the habitable state of many cottages and to the condition of the river bed, it is unnecessary that particular recommendations should be made. These are matters of detail which can only be properly dealt with by the medical officer of health, and by him only on condition that the local board will exercise its functions in respect to nuisances. This it has not done. It was not even required from its inspector that he should keep a register of his inspections, of the recommendations he has made, and of the action taken upon them. In fact the functions of the local board as to nuisances' removal have been suffered to fall in abeyance, and as a preliminary measure to the due resumption of these functions and to the efficient execution of the suggestions already made, the local board should require from its inspector a proper record of the work he performs, and it should itself keep a record of the action it takes upon the information of the inspector or of the medical officer of health.'

Medical Officers' Reports

SOUTHPORT.—The health committee of this borough have just reported that during the official year ending September 30, 1877, the hospital for the reception of infectious diseases has been completed and occupied to a small extent, that the milk dealers have been looked after, a large number of cesspools abolished, above 10,000 tons of night-soil removed, and a large number of nuisances abated. That the death-rate for 1876–77 has been gradually falling from 18·06 in 1872 to 16·45 per 1,000 inhabitants, and the gross death-rate, that is to say, inclusive of non-inhabitants, from 22·82 to 19·31, and the zymotic death-rate from 1·49 to 0·85 per 1,000, which is singularly small. It was stated that all persons admitted into the hospital would be charged for their medical attendance and maintenance, but the Clerk said that this rule applied only to those who could pay, as the poor were maintained and attended free.

POPLAR.—This district is subdivided into two parts, the Northern and Southern Districts, each presided over by a medical officer of health, the former by Dr. Talbot, and the latter by the late Mr. Ellison. The reports are open to the objection that they are written for the year ending March 31, and also especially that by Dr. Talbot to the great drawbacks that the text does not at all fully discuss the tables, and that the latter themselves are excessively meagre and do not correspond with those of any other

metropolitan district. The greatest part of the text is taken up by a description of the progress and extent of the small-pox epidemic, which appears to have prevailed most extensively in Bromley, more so indeed than at Homerton, which forms part of the adjoining Hackney District. We have endeavoured to compare the progress and extent of the disease in Hackney and Poplar, but are unable to do so in consequence of the different periods for which the tables are kept, and also because there are no monthly tables for Poplar; but it is certain that the disease did not assume an epidemic form until a later period than in Hackney. It is also doubtful if the deaths amongst the large number of cases removed to the Highgate and Homerton Hospitals are included in he tables, but 732 cases and 149 deaths are acknowledged for the two districts, so that the epidemic must have been very severe. In the south district the births and deaths were both fewer than in 1865–6, so that we suppose the district has not increased in population; but in the north district the numbers are given only for the year 1876–7, and the death-rate is estimated at 21·2 per 1,000, after deducting 594 deaths in public institutions. The list of sanitary work shows that there is no regular house to house inspection, as in the south district 873 complaints are noted as having been entered in the books, and in the north that the number of houses inspected was 1,619, and of complaints entered 926, showing only 700 houses inspected more than the complaints, of which apparently 386 were in consequence of small-pox having occurred in them. It may be that the 1,619 houses inspected were in excess of the complaints, but if so the fact is not mentioned in the body of the report.

CHELTENHAM.—The public health of Cheltenham during the quarter ending September 29 is reported as having been unusually good, there having been but comparatively few cases of illness, and a diminished death-rate. A case of small-pox was discovered in a small house, and was removed to the hospital, so that the disease did not spread, although a sister, well vaccinated, had slept with the patient for several days. The house was thoroughly disinfected, and the clothes destroyed. Scarlet fever also broke out in a family and attacked eight, all of whom were removed to the hospital and recovered. In this instance the disease was confined to the one family attacked. The annual death-rate was as low as 12·57 per 1,000 population.

BOSTON, UNITED STATES.—The annual death-rate for the week ending September 1 was as high as 26·7 per 1,000, in consequence of the large number of deaths from diarrhœa, viz., 62, out of which 51 occurred amongst children under five years of age. There were 7 deaths from diphtheria, 7 from typhoid out of 187, and 62 deaths of children under one year old, being one-third of the whole. The mean daily temperature was 72·5°, and the maximum 91·5°, which may partly account for the great mortality from diarrhœa, although it is far greater than we should have expected in London at that temperature.

Law Reports.

ADULTERATED GIN.

AT the Coleshill Petty Sessions, G. Meeking, of the Horse and Jockey Inn, Corley, was summoned by the inspector of nuisances for the Minden Union, for selling gin adulterated with water. The inspector visited the Horse and Jockey, and bought a pint of gin, for which he paid 2*s*. He then sent some of it to Dr. Hill, the County analyst, who pronounced it to be 32 degrees under proof. Neither jar nor bottle was labelled according to the Act. The defendant said he never heard of such an Act before. The inspector said he had sent a notice of his visit to the defendant, whose agent said that if the inspector came he was to tell him the gin was diluted with water, and was of 'the right strength to sell, being 22 under proof.' The Bench fined the defendant 1*l*. 2*s*. 6*d*., including costs.

UNSOUND TONGUES.

J. CHAMBERS, bacon factor, Sunderland, was summoned for exposing for sale, a number of pigs' tongues, unfit for human food. Mr. Moore, Town Clerk, said that 214 pigs' tongues were found in the defendant's possession. They were putrid. The defendant must have known that the tongues were utterly unfit for food. Mr. Hindmarch, sanitary inspector, said his attention was called to the tongues, which defendant's son was selling. They had a very offensive smell, and appeared unfit for food. He had a sample of them examined by Dr. Spear, who condemned them, and he then got a magistrates' order for their destruction. Dr. Spear said he examined the tongues, and found them in a state of putrefaction. The defendant admitted the tongues had a bad smell, but said that was accounted for by the brine spoiling. When the tongues were washed they were quite wholesome. The stipendiary said the defendant was liable to a penalty of 20*l*. for every tongue exposed, that would amount to a fabulous sum. He fined him 10*l*. and costs.

BRIEF NOTES OF CASES.

DEFECTIVE PAVEMENT.

1877. *Whiteley* v. *Pepper*.—Negligent opening of a coal-plate in a highway. Accident. Defendant, the coal merchant, held liable for the negligence of his carman. (46 L.J., Q.B., 436; L.R., 2 Q.B.D., 276; 36 L.T., 588.)

HIGHWAY ACT, 1835, § 72.

1875. *Pease* v. *Paver*.—Damage to highway by mining operations. Defence that the lessees were legally entitled to carry on their mining operations irrespective of the effect thereof on the highway. Conviction of lessees quashed. (39 J.P., 407.)

LANDS CLAUSES ACT.

1866. *Balls* v. *Metropolitan Board of Works, in re.*—Lands Clauses Act, 1845, §§ 68 and 51. An offer of compensation must be unconditionally for the injury done. Offer of one sum for compensation and costs held bad. (35 L.J., Q.B., 101; L.R., 1 Q.B., 337; 7 B. and S., 177; 13 L.T., 702.)

LIABILITY FOR ACCIDENTS.

1868. *Whitman* v. *Pearson*.—Contractor under a board. Accident owing to horse being left unattended and running away with a cart during driver's dinner-hour, driver having also disobeyed orders in driving home for his dinner. Master held liable, nevertheless. Notice of action not required. (Metropolis.) (37 L.J., C.P., 156; L.R., 3 C.P., 422; 18 L.T., 290.)

Legal Notes and Queries.

THE COMPULSORY NOTIFICATION OF INFECTIOUS DISEASE.

THE Bolton Improvement Act, 1877, contains the following provisions for the compulsory registration of infectious diseases: Section 87. In order to secure that due notice be given to the corporation of any inmate of any building used for human habitation who is suffering from small-pox, cholera, or any contagious or infectious fever the following provisions shall have effect (that is to say): 1. If any such inmate be suffering from any such disease as aforesaid, the occupier or person having the management or control of such building shall, as soon as he shall become aware of the existence in any such inmate of any such disease, forthwith give notice to the Corporation at the

Town Hall of the existence in such inmate of such disease; 2. If such inmate be not a member of the family of such occupier or person, the head of the family (resident in such building) to which such inmate belongs, or if there be no such head, then such inmate (unless prevented by reason of such disease or of youth), shall on becoming aware of the existence in such inmate, or in his own person, as the case may be, of such disease forthwith give notice thereof to such occupier or person; 3. The Corporation shall provide and supply gratuitously to every registered medical practitioner, resident or practising in the borough, forms for the certificate or declaration by such medical practitioner of the particulars hereinafter mentioned in relation to such cases according to the form set forth in the fifth schedule to this Act. 4. Every medical practitioner attending on or called in to visit such inmate shall, on becoming aware that such inmate is suffering from any such disease as aforesaid, forthwith fill up, sign, and send to the corporation at the townhall a certificate or declaration, stating, according to the forms prescribed and supplied to him by the corporation, the name of such inmate, the situation of such building, and the name of such occupier or person, and the nature of the disease from which such inmate is suffering. 5. The corporation shall pay to every medical practitioner who shall, in pursuance of this section, duly make and give any such certificate or declaration, a fee of two shillings and sixpence for each such certificate or declaration; and any person who shall offend against this enactment (unless ignorant thereof, the burden of the proof of which shall be on him) shall for every such offence be liable to a penalty not exceeding ten pounds.

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

LOCAL BOARDS AND LODGING HOUSES.

(*To the Editor of the* SANITARY RECORD.)

SIR,—After driving up from the South of England, through Shropshire, and Staffordshire; after visiting Church Stretton, Buxton, Chester, and other places, we drove on to Llandudno, and after making a stay there of about three weeks, we turned our horses heads homewards; with regard to this homeward journey I beg to be allowed to make a few remarks.

I would wish to say a few words as to Llandudno itself, and I would ask is there a single ventilating pipe from a single drain, or a single closet?

Most people like the place immensely; in the 'season' it is a most difficult thing to get a bed anywhere; when we arrived there, the hotels were crammed; the idea of giving us rooms at the moment, without some days' notice, was treated as ridiculous; and it was only after some trouble that we managed to get the rooms we wanted, in a lodging house. Probably most of your readers know Llandudno. It is situated on a stretch of land lying between the Great and the Little Orme's Head; it is open to the sea throughout the whole of its front, and also throughout a considerable portion of the back of the town, facing towards Conway; it gets breezes enough, no doubt, but how anyone could have pitched upon this stretch of land as a fit place for a healthy seaside resort, I cannot imagine; I believe that the drainage is carried off into the sea at the back; if I recollect right, long pipes carry it out to sea. The town lies low between two seas; as the tide ebbs and flows, the mass of sewage must retire and advance; even if the sewage is not driven back, the foul air must be. I could not imagine a more fit place for a perfect system of traps and ventilating pipes; if you walk towards the Orme's Head, you soon get on rising ground, the roofs of the houses are easily seen; I have often looked, and I don't believe there is a single ventilating pipe from a closet in the whole of Llandudno.

The consequences must be that whatever good you may gain from the fine fresh breezes out of doors is more than equally counteracted by the air that you breathe indoors. I have been in several lodging-houses there, and the air breathed in them seems to me to be much the same as is found in most houses of the kind, viz. a mixture of smells from the kitchen, from the drains, and from chloride of lime. The season, I own, lasts but a short time, and during the winter things have probably time to right themselves; still, I would strongly recommend anyone who may intend to go there next summer to ask two questions before going into lodgings, viz. 'Are your drains trapped and ventilated where they leave the house?' and also, 'Is your soil-pipe ventilated?' If by next summer these two questions can be answered in the affirmative, I am confident that I shall then breathe there in my lodgings purer air than I did last summer.

The same absence of all idea of ventilation seemed to me to exist at every place where we stayed on our homeward journey; some places were necessarily worse than others. Among the hills, as at Capel Currig, Beddgelert, etc., there are usually closets out of doors, so that those indoors are less used than they otherwise would be. I would here mention that this system of out of door closets might be far more generally carried out in private houses than is now the case. Again, there are very small places, which I could mention, where the hotels are small, and few people ever stay there, so that their closet arrangements, although faulty and free from any kind of system of ventilation, are practically sufficient, and act tolerably well.

As far as the larger towns are concerned, the same thing seems to go on everywhere—building on all sides and houses run up hurriedly, and in an unsatisfactory manner, to be immediately let to unwary visitors; in all these houses, the trapping of the drains and the ventilation of the closets should be insisted upon by the local boards.

Another reason for the entire absence of any practical knowledge in sanitary matters in some places is, that since the introduction of railways they have lost the patronage and custom which they used to enjoy in the old days of slow travelling. I may mention one place, Hay-on-the-Wye, as an illustration of my meaning. We had been told that there was only one large hotel in the place, and there we went. The ceilings showed traces and stains of rain and damp, the closet upstairs was over the staircase from the ground floor, and its floor (looked at from below as ceiling) showed unmistakable signs of leakage, and the smell upstairs at about 9 or 10 A.M., probably when some waste water was being thrown down the closets, etc., was most sickening. The whole of the state of the town seemed to me such as to call imperatively for the action of the local board, if it possesses one.

No doubt this state of things has a very easy explanation, viz., that things have changed with these houses; that they used to have families often staying there at night, when posting, and that now travellers by rail pass them by; and that their proprietors cannot afford, from loss of patronage, to spend money on the adoption of sanitary matters; but I distinctly state that some one ought to be responsible for the healthiness of the place where I am supposed to stay for the night in any town; and local boards, both at inland towns and at seaside watering-places, are regardless of their duty unless they see that travellers putting up at hotels are to some extent protected from the evil effects of the disgraceful state of things to which I have alluded.

In Somersetshire we stayed a day or two in a large first-class hotel, in one of the largest towns. There were two closets in our part of the hotel, one above the other, on the first and second floors; the smell in the lower one was unbearable, the upper one was tolerably free from smell. I was merely told, in explanation, that one was

used more than the other. I need not add that the advantages of a trap and ventilating pipe were quite unknown.

The fact remains that in all hotels and lodging-houses the commonest principles of ventilation of closets and of trapping and ventilating the drains are quite unknown, or, if known, are disregarded; it cannot be doubted that many diseases and illnesses are contracted by staying in these houses; it is quite impossible for travellers or for persons who come to take lodgings at a watering place, to find out whether sanitary matters are attended to in each house, as they should be, nor even whether there may not have been recent cases of infectious diseases in these houses; these particulars should be periodically looked after by the local boards, and a certificate might easily be given to everyone having lodgings to let, and to every hotel keeper stating: (1). That the soil-pipes are ventilated; (2). That the drain is trapped at its leaving the house, and that a ventilating-pipe is fixed to the drain just outside this trap; (3). That the scullery-pipe, and housemaid's closet-pipe, do not communicate direct with the drain.

What a relief it would be to one's feelings, when looking out for lodgings, to have such a certificate handed to one for inspection, by the keeper of the house. Unfortunately, the proprietors of these houses are sometimes themselves members of the Local Board, and seem rather to prefer risking the health of visitors to going to any expense in cleansing, and draining, and ventilating their houses; still this matter should be obligatory, and not voluntary; that it will be so before long, I have no manner of doubt; the subject of closets, and drains, and of the illnesses incurred by their being in an unhealthy state, is one which is gradually taking forcible hold of public attention; it is impossible to believe that what we do in our own houses, we will neglect the use of in houses where we take temporary lodgings; the necessity of looking to these matters may be impressed on hotel proprietors and lodging-house keepers before next summer, from a pecuniary point of view; and I would at once strongly recommend anyone who values his own or his children's health, and who intends to go into lodgings, especially for any length of time, to make a point of obtaining an answer to these questions before taking up his temporary abode at any hotel or lodging-house.

The whole thing is merely a matter of very small expense; before next summer every hotel and every lodging-house might be properly ventilated; two ventilating pipes, a siphon-trap, and a couple of bell-traps are all that is required. In leaving this matter in your hands, let me hope that some enterprising hotel proprietor will add to his advertisement the words 'closets and drains ventilated.' Other houses will have to follow suit; and we shall not have a feeling of dread of disease, and perhaps death, when we write for rooms at a watering-place, or when we go to spend a short time at a sea-side hotel.

If nothing is done by proprietors of houses and of hotels in this direction, it is only fair to point out to them and to local boards that the interest in these matters is daily increasing; many persons not only think but talk about drains now, who would never have thought of doing such a thing ten years ago; and the numbers who now crowd to the seaside, as well as to the inland watering-places, will insist on being protected in sanitary matters.

I might specify the places and the very houses where instances of illness, if not of death, are supposed to have originated; but I am certain that public opinion will make itself heard in this matter; the heir of the heir to the throne was attacked by fever a short time since, and we were quietly told that the drains of Marlborough House were out of order, and were being looked to; lives have been sacrificed at the War Office, and yet with the characteristic apathy of our War Department things go on much the same; it seems that it cannot be impressed into our official mind that if a down-cast of fresh air comes into a drain one side, and a ventilating pipe goes up on the other, that drain cannot do harm to anyone.

My subject, at present, only refers to country towns and villages; in these the matter rests entirely in the hands of the local boards and sanitary officers; licenses should be granted to lodging-houses, specifying that the necessary sanitary arrangements have been carried out in them; and in these houses, as well as in hotels, these arrangements must be insisted upon. J. R. T.

THE RIVER RIBBLE.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Now that the Rivers Pollution Act has come into operation, surely the river Ribble will not be allowed any longer to be polluted with town sewage. I observe that all the towns on the river Irwell are, at the invitation of the Town Council at Salford, to have a meeting in reference to the question of preventing the pollution of the river Irwell with town sewage. Now, sir, why cannot our Town Council call a meeting of all the towns on the river Ribble and its tributaries, and decide a means of preventing pollution of the river? Well, unfortunately, our Corporation turn the sewage into the river, and have not yet any scheme for purifying the sewage previous to its passage to the river. Now, the Salford Corporation have already commenced works for the purification of their sewage. Therefore, they are in a position to call a meeting to consider what steps towns situate above Salford on the river Irwell are going to take to prevent their sewage going into the river; and I suppose our town, not being in such a position, cannot very well call such a meeting, and if they did, they no doubt would be asked—what do they propose to do themselves to purify the sewage of Preston, which at present finds its way into the river Ribble unpurified.

If, I take it, Sir, our Corporation do not set to work in this matter the same as other towns are doing, there is no doubt that the inaction of such towns as Preston in the matter will force Parliament to step in and pass a very stringent Act.

Since this question of the pollution of rivers has assumed such a popular form it will not be allowed to rest, and why our Corporation, when they have the opportunity of purifying one of the most beautiful and picturesque rivers in the country will not at once set to work to exclude all town sewage from the river, I cannot tell. But surely some member of our Town Council, when they meet for the first time in the next municipal year next month, will take care that this question receives an early attention, and is not allowed to rest again until something is decided upon which will be an effectual beginning of the settlement of this question—the taking out of the river Ribble and its tributaries the sewage of the towns.

There are other authorities situate on this river besides ours—which have done nothing in this matter. There is Clitheroe, with its ancient corporation, still pollutes the river with its sewage—in fact, there are only one or two towns which have done anything at all—and the question very naturally arises if Parliament puts into the hands of the local authorities the power to take out of our rivers 'town sewage,' and local authorities show no disposition to exercise that power, and in opposition to public opinion, I take that it will be no wonder if Parliament puts the power into other hands—conservancy boards. Therefore it behoves local authorities to move in this matter and at once.—I am, sir, yours obediently,

Preston, Oct. 24, 1877. PRESTONIAN.

FALSE ECONOMY.

(*To the Editor of the* SANITARY RECORD.)

SIR,—'Saving at the spigot and pouring out at the bung-hole' is an old saw which is being thoroughly illustrated at Bognor. Three years ago a water company wisely determined to sink a deep well to supply the town with an abundance of good water, and contracts were entered into for the purpose of sinking the well, which was all just as it should be; but at this stage the authorities

appear to have become purblind, and thought it would be a great saving to dispense with the services of a clerk of works. The consequence is they have got into great trouble with the well, everything having gone wrong, and it is estimated that it will cost more to put the well into good working order than the cost of a new well, for they will never be able to prevent the surface water from soaking into it, owing to not taking the necessary precautions in the first instance. If an experienced clerk of works had been employed from the beginning to see the work properly done, he would have prevented all the present trouble, time, and extra expense, which will amount to 1,500*l.* more than would have paid for the services of a resident engineer. When will our authorities learn wisdom? The local board of health of Littlehampton, not far from Bognor, held a special meeting on Thursday last, at which, with Bognor staring them in the face, they actually proposed and discussed the desirability of dismissing their clerk of works, and saving (?) his salary, because there was not much for him to do at the well! If the board can really save his salary, let them do it, but let them have a care they do not get a Bognor well, that will eventually cost them fifty times more in engineering and legal expenses than they save from the salary of the clerk of the works. How many boards of health have been led into ruinous engineering and legal expenses by such cheese-paring economy? How many boards are there that think it is a saving to employ incompetent surveyors and engineers to execute their sanitary works, at a salary less than a common bricklayer receives? I hope Mr. Wigner will keep his promise to 'examine a sample of the water from the new well, and report on it' (especially if the board have the work done without the supervision of an efficient clerk of works), that we may know whether it is water or sewage we are to get by the saving of the salary of a clerk of the works.

I know that the soil which surrounds the new well is such that both surface-water and sewage can and must filter into the well, if particular care is not taken to prevent such infiltration. At the same time I must say that all infiltration from the surface anywhere within many miles of the well can be efficiently prevented by a thoroughly experienced resident engineer insisting on the work being done according to his orders, subject to the approval of the engineer-in-chief. For the above reasons I would respectfully advise the Littlehampton Local Board in all friendliness to be careful how they tamper with the instructions of the engineer. Perhaps the board have some idea of saving the *expense* of stopping out the surface-water, because it will save the *expense* of boring so deep to get the required quantity, the *quality* being in their eyes of minor importance; hence the *necessity* for dismissing the clerk of works, who might object to having such a well constructed under his eyes. TRUE ECONOMY.

October 22, 1877.

MEDICAL OFFICERS AS WITNESSES.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Will you kindly give a full reply to the following query?

'In the event of a sanitary authority prosecuting before the magistrates under the Public Health Act, is its medical officer of health bound to attend and give evidence at the court as part of his public duties, or has he a right to receive a special fee for so doing?'

I find in your issue of January 30, 1875, you state that a medical officer of health has no claim on his employers for services rendered before justices; but, if my memory serves me right, I think sometime about August, 1876, you published that Lord Chief Justice Cockburn had given a decision that the rendering of services before courts was not part of the medical officer of health's duty, and that for doing so he was entitled to the usual fee and expenses.

Your kindly stating the law for our guidance will prove of value to many besides myself. X. Y. Z.

[We have more than once expressed our opinion on this point, and are unable to see any reason for changing it. It is to the effect that if a medical officer is paid for the whole of his time, his employers may fairly call upon him to give evidence on their behalf, without thereby putting themselves under any legal obligation to make him a special payment for giving evidence. Where a medical officer is not exclusively employed as such, then some special arrangement should be made as to his services as a witness in a court of justice.

We do not remember any opinion having been given by Lord Chief Justice Cockburn to the effect mentioned by our correspondent. If he can send us a copy of it, we shall be obliged, and will give it our careful attention. —ED.]

HOUSE DRAINAGE IN RELATION TO HEALTH.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Will you permit me space for a few remarks on Mr. Buchan's letter in your issue of October 19?

Mr. Buchan takes objection to Dr. Buchanan's elegant sketch from the annual report to the Local Government Board, 1875, and talks about details not being worked out. To my mind it is Mr. Buchan's sketch worked out in detail that is really at fault, for his latest invention of the air-pipe at A (on Mr. Buchan's sketch) is shown and also referred to as a small pipe. Now, Sir, this pipe to be of service when the grating is blocked up with snow should be of area at least equal to the soil-pipe entering the trap, but preferably much larger, as Dr. Buchanan has shown on his sketch.

The arrangement sketched by Dr. Buchanan can be worked out in all details, and when so makes a very simple and effective disconnection of soil pipes. When the depth to the drain is great the arrangement may be modified by constructing a small brick shaft or manhole covered by an open grating, and thus giving means for inspecting the siphon trap.

The arrangement sketched by Dr. Buchanan is shown clearly, and worked out in detail in the regulations for house drainage by Mr. Rogers Field.

The Buchan trap is occasionally a useful arrangement, but I think if the inlet were put at an angle upwards it would be still more useful. J. WALLACE PEGGS.

4, Queen Anne's Gate, Westminster, S.W.

THE WATER-SUPPLY OF SEA-SIDE WATERING PLACES.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Allow me, through you, to thank Mr. Wigner for his courteous and prompt reply to my queries. Not having a copy of the *Analyst* for June, 1877, by me, I do not know what Mills' Colorometer consists of. At the suggestion of a medical friend, who told me he used a scale of gradually flashed glass, I made a colourless scale on paper to save the trouble of the portion of the Nessler process, but I have no doubt but that my friend's flashed glass, through its transparency, is the most accurate.

I hope Mr. Wigner will be induced to embody his water analysis experiences in a hand-book form.

Mr. Wigner, I think, overlooks the large amount of salt we each consume as a condiment in the course of the day, and am still of opinion that even used in a rough and ready way, the permanganate test is of great utility. Again thanking Mr. Wigner. WM. JACKSON.

Surveyor to St. Neots Local Board,

TURPENTINE AND TEREBENE AS DISINFECTANTS.

(*To the Editor of the* SANITARY RECORD.)

SIR,—In reply to Mr. Kingzett, I have to state that my experiments on the influence of light in producing ozone, alluded to in my paper read at Leamington, were performed twenty-nine years ago, that they were repeated

for a special purpose in 1860, and that I had no knowledge whatever of comparison having been made between turpentine and terebene as ozonising agents, by him or anyone else. T. MOFFAT.

Hawarden, October 27, 1877.

Sanitary Inventions.

A NEW LAUNDRY COMPANY.

THE progress of sanitary and medical science has resulted in an increase of our knowledge of the means to be adopted to prevent the spread of infectious and contagious disease, and shown that by the use of disinfectants, the isolation of patients, and the exercise of proper care, the ravages of these maladies may be, and often are, confined to the individuals who suffer from the effects of direct infection.

This object being attained, it too often happens that the precautious end here, and infected garments and bedding are allowed to pass out of the house to a laundry, without the slightest warning as to their dangerous character being given to those into whose hands they fall; such wanton and criminal disregard for the safety of others has, as we have frequently pointed out, led to the most lamentable results. Several instances have been cited in these pages, and by our contemporaries, of the disastrous results which have attended this pernicious system. It has been conclusively proved that many cases of small-pox, scarlatina, typhus, and other fevers have been traced to the exposure of infected clothing in laundries, and by mixing articles so charged with the germs of disease with others while in these places.

Another evil arising from this ordinary treatment of clothes which require special means to be used for their disinfection, consists in a disregard of proper precautions in laundries, and the inadequacy of mere boiling and washing to render them innocuous. Besides this, it is well known that the same receptacle is used again and again for lengthened periods, without any means being adopted for its thorough cleansing. A further source of danger arises from an inadequate supply of water and imperfect washing, and the inability of the people who carry on a laundry business on a small scale to adopt expensive but efficient machinery for the thorough performance of the various operations necessary to secure safety to the public.

These facts having come under the notice of many medical men and others aware of the dangers of the present system and desirous of removing them, has led to an urgently needed reform being carried out in the establishment of a laundry on a wholesale scale where all the appliances which modern science and manufacturing skill have produced will be used under proper supervision by competent persons. We refer to the Parisienne Laundry Company, (Limited). This company will very shortly commence operations, and, as its directors have adopted a thorough system calculated in the highest degree to meet the demands of the most enthusiastic sanitary reformer, we propose to give a sketch of its plan of operations.

Extensive premises, the whole occupying some three acres of ground, have been taken in an open space at Broomhouse Lane, Fulham. A supply of water on the most liberal scale will be provided, and machinery of modern and improved construction used for every operation, such as washing, steaming, rinsing, mangling, and pressing, and last, but not least, special precautions have been taken with regard to disinfecting articles which require such treatment.

All the *employés* of the company performing the manual labour will be lodged in houses under the supervision of a sanitary inspector, a further safeguard against the spread of disease, showing how carefully every detail has been considered.

To trace a parcel of clothes from its collection to final delivery will be perhaps the most practical means of giving an idea of the system adopted by the company.

Each customer will be provided with a separate basket, of which a key will be kept by himself, and at the company's establishment. A stringent regulation ensures that due notice shall be given when parcels of infected clothing require removal. By no chance can they come in contact with non-infected articles, means being adopted for their isolation. A special van, used for no other purpose, will be sent for such articles. On arrival, they pass at once to a disinfecting apparatus of peculiar construction, and arranged in such a way that they need not be touched until the completion of the operation, danger from infection being thereby thoroughly removed. No mixing of clean and dirty articles will be allowed, each class being treated according to its various requirements. A careful sorting of cotton and linen goods from woollen and coloured articles will secure proper treatment, and the risk of injury to delicate fabrics avoided by absence of wringing machines. Entering by a door used for entrance only, the various processes are gone through with the regularity and precision only attainable in a large establishment.

The whole of the operations will be completed within forty-eight hours; a very necessary arrangement, when it is taken into consideration that the company anticipates a weekly list of from forty to sixty thousand items. When ready for delivery the articles belonging to each customer will be collected, carefully packed in the baskets, and loaded in the vans, finally passing out through a door used for exit only. No linen will be received from hospitals, infirmaries, or other institutions for the treatment of the sick. A lady directress is to reside near the premises, and by her constant supervision, alert intelligence, and attention to every detail, insure the efficient conduct of the business of the company so far as the practical part of its work is concerned. A sanitary inspector has also been engaged, who will give instructions and superintend the process of disinfection.

The scale of charges is moderate, and considering the saving in wear and tear secured by the use of perfect machinery and the entire exclusion of injurious washing ingredients, the customers of the company will have a very decided advantage, as far as economy is concerned. A description of the premises and machinery will be given in an early issue.

MULLER'S ALPHA GAS-MAKING APPARATUS.

IN our last issue this apparatus, exhibited at the Leamington Exhibition, was briefly noticed; by a printer's error 'Miller,' instead of 'Müller,' was inserted as the name of the manufacturer. Many of our readers who reside in rural districts and small towns without a gas supply, must have frequently lamented the absence of a light so easily managed and economical as gas. Though many lamps, some of them thoroughly satisfactory when in action, are before the public, they nearly all have some defect; if the light is brilliant and sufficient there is frequently a danger of explosion, and with every description of lamp, whether burning colza or mineral oil, constant attention is required to obtain satisfactory results. Coal gas, though economical and giving little trouble when supplied direct to the consumer, cannot be manufactured on a small scale except at considerable outlay in erecting a complicated and expensive apparatus. The bricks alone for a coal-gas apparatus would cost more than one of the machines of equal power. The production of coal-gas besides requires the constant attention of a skilled workman, whose time must be entirely occupied with the work. Müller's Alpha gas machine produces a brilliant steady light at a very low cost, and does not require any special knowledge to work it. A few gallons of gasoline are poured in once in two or three weeks, a handle turned to wind up the weight, which, continuing in its descent,

performs the operation of mixing the vapour of gasoline with air in certain proportions, the result as we have stated, being a light equal, if not superior, to coal-gas, non-explosive, inodorous and economical in use. The apparatus is compact and entirely self-contained, with the exception of a point of support for the pulley, sustaining the weight, putting the machine in action. A 60-light machine occupies a space 36 in. by 30 in. No unpleasant or deleterious effects are produced by this description of gas. Sulphurous and ammoniacal odours are entirely absent, book-binding is uninjured, gilding and other decorations are not soiled, danger to health incurred in using coal-gas is obviated. That competent judges have given practical proof of their appreciation of the 'Alpha' machine by awarding it prize medals at numerous exhibitions shows the apparatus possesses the qualities claimed for it by the inventor. Hundreds of them are in use in various parts of the country, and in the Colonies, etc., giving satisfaction, as shown by numerous testimonials we have had an opportunity of inspecting. They range over every variety of situation, including country mansions, churches, chapels, hospitals, infirmaries, cottage hospitals, etc. Gas fittings already in use can be utilised when adopting the apparatus described, with the exception of the burners, which must be replaced by those especially adapted to the quality of gas produced. The cost of the alteration would, however, be very trifling, and amply compensated by the increased comfort obtained. Mr. Müller, 22, Mary Ann Street, Birmingham, is the manufacturer.

DRAY'S PATENT CONCEALED URINAL.

THIS simple contrivance has been brought under our notice, and as the apparatus has merit, from a sanitary point of view, we think a description may prove of interest to our readers, especially those who desire to adopt inventions, securing the perfect sanitary arrangement of buildings, whether public or private. It is not in accordance with the dictates of good sense that an apparatus though necessary should obtrude itself upon the notice, and beside this offence to good taste, too often render itself offensive by the odour arising from it. Both these objections are disposed of in this new contrivance, which is simple, efficient, economical, and admirable from the ease and certainty with which every part may be reached for the purpose of cleansing and the use of disinfecting fluid when required at intervals. In all receptacles for excreta, these precautions should be used; but as far as the parts actually forming this contrivance are concerned, their application may be delayed for a long period if a little care is taken to occasionally cleanse the small surface exposed, with the water used for flushing.

In outward appearance the appliance under notice might be easily mistaken for the door of a smoke flue, or an Arnott's ventilator, some nine or ten inches wide by six deep on the face of the wall. A small knob at the upper part of the plate rather increases this impression. The door is so arranged as to close by its own weight. When open it stands at an angle of forty-five degrees with the wall, and has sides triangular in shape, and resembles in appearance an ordinary oblong box, cut in half—though its greatest length divides it into two receptacles with the sides at angles, and closed at each end. No hinge is used, but a neat, effective, and perfectly tight joint at the bottom of the plate thoroughly closes in the pan. This can be lifted out bodily for cleaning, and every portion of the interior part of the apparatus is then readily reached for the same purpose. The flushing water is obtained by pressing a very small knob, placed at a convenient height. No expensive alteration of existing arrangements is entailed, a hole some six inches deep being cut in the wall, and of the height and width of the door or external plate.

Messrs. Dray, Jones and Co., of 27 Castle Street, Leicester Square, are the manufacturers.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

BOWYER, Mr. William John, has been appointed Surveyor to the Cambridge Improvement Commissioners and Urban Sanitary Authority, at 156*l.*, and 52*l.* in lieu of pony-trap for one year.

COOK, John William, M.D., Univ., Aberd., M.R.C.S. Eng., has been reappointed Medical Officer of Health for the Tendring Rural Sanitary District, Essex, at 100*l.* for one year.

DIXON, Mr. William, has been reappointed Inspector of Nuisances for the Dalton-in-Furness Urban Sanitary District.

FARRINGTON, Mr. James, has been reappointed Inspector of Nuisances, for the Runcorn Rural Sanitary District, and his salary increased from 120*l.* to 140*l.* per ann.

IRVINE, Thomas Johnstone, L.R.C.P. Edin., L.R.C.S. Edin., has been appointed Medical Officer of Health for the Garstang Rural Sanitary District, Lancashire, vice the District Medical Officers.

JACOB, Mr. Arthur, has been appointed Surveyor and Engineer to the Corporation and Urban Sanitary Authority of Salford, vice Fowler, at 700*l.* per ann.

JONES, Mr. Edward William Taylor, has been appointed Public Analyst for the North Division of Staffordshire, at 100*l.* per ann. and 6*s.* per analysis.

KELLY, Charles, M.D., Univ. Lond., M.R.C.P. Lond., has been reappointed Medical Officer of Health for the East Preston, Horsham, Midhurst, Petworth, Steyning, and Thakeham Rural, and the Littlehampton, West Worthing, and Worthing Urban, Sanitary Districts, at 600*l.* per ann. for three years.

MORGAN, William, Ph.D., F.C.S., has been appointed Public Analyst for Cardiganshire, at 5*l.* per ann., and 15*s.* per analysis.

POLLARD, William Robert, L.R.C.P. Edin., L.R.C.S. Irel., has been appointed Medical Officer of Health for the Blackburn Rural Sanitary District, vice Forrest, resigned, at 30*l.* for one year.

SANDFORD, Folliott James, M.D., Univ. St. And., M.R.C.S. Eng., has been appointed Medical Officer of Health for the Drayton Rural Sanitary District, vice Harding, resigned.

SUGDEN, Mr. John, has been elected a Member of the Cleckheaton Local Board and Urban Sanitary Authority, upon the annexation of the hamlet of Oakenshaw.

SWETE, Edward Horatio Walker, M.D., Univ. St. And., F.C.S., has been appointed Public Analyst for the County of Radnor, at 21*s.* per analysis, and travelling expenses when required to attend and give evidence.

SWIFT, Mr. William, has been appointed Clerk to the Huyton-with-Roby Local Board and Urban Sanitary Authority, Lancashire.

VINCENT, Henry Bird, M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the East Dereham Urban Sanitary District, at 25*l.* per ann.

WILSON, Mr. Benjamin, has been elected a Member of the Cleckheaton Local Board and Urban Sanitary Authority, upon the annexation of the hamlet of Oakenshaw.

VACANCIES.

CUMBERLAND. Public Analyst.

GUILDFORD. Public Analyst. Application, 2nd instant, to Ferdinand Smallpiece, Town Clerk.

HUYTON-WITH-ROBY LOCAL BOARD AND URBAN SANITARY AUTHORITY, Lancashire. Surveyor and Inspector of Nuisances, and Collector: 150*l.* per ann. and house. Application, 3rd instant, to William Swift, Law Clerk, 71, Lord Street, Liverpool.

KENILWORTH LOCAL BOARD AND URBAN SANITARY AUTHORITY, Warwickshire. Clerk. Surveyor.

LEOMINSTER URBAN SANITARY DISTRICT. Inspector of Nuisances. Application, 6th instant, to G. T. Robinson, Clerk.

MATLOCK. Certifying Factory Surgeon.

NEWPORT RURAL SANITARY DISTRICT, Monmouthshire. Inspector of Nuisances: 150*l.* per ann. Application, 12th instant, to W. Downing Evans, Clerk.

PRESCOT LOCAL BOARD AND URBAN SANITARY AUTHORITY, Lancashire. Surveyor and Inspector of Nuisances: 80*l.* per ann. Application, 7th instant, to Henry Cross, Clerk.

SALTLEY LOCAL BOARD AND URBAN SANITARY AUTHORITY, Warwickshire. Treasurer.

WESTBURY ON SEVERN URBAN SANITARY DISTRICT. Inspector of Nuisances: 25*l.* for one year. Application, 6th instant, to M. F. Carter, Clerk to the Authority.

'THE DUPLEX CAR is the lightest, prettiest, best constructed, and best appointed car that has ever been brought under our notice.'—*Church Review.* Inventors, Patentees, and Builders: S. HATCHARD & Co., General Funeral Furnishers, 47 Crawford Street, W. Miniature Duplex Cars (used open or closed, drawn by men or horse) built for the country.—ADVT.

NOTICE.

THE SANITARY RECORD *is published every Friday morning, and may be ordered direct from the Publishers. Annual Subscription, 17s. 4d.; free by post, 19s. 6d.*

Original Papers.

ON THE WATER-SUPPLY OF SEASIDE WATERING-PLACES.

BY G. W. WIGNER, F.C.S.

(*Continued from p.* 262.)

SUMMARY OF THE RESULTS OBTAINED ON THE NORTHERN AND WELSH COASTS.

I THINK it will be convenient at this point to make a further summary of the results I have obtained by the analyses of the waters which have been published in the numbers of the SANITARY RECORD for October 5, 12, 19, and 26. The samples of water I have reported on have come from all the places to which I sent my assistants on the coasts of Yorkshire, Cumberland, Lancashire, and North and South Wales and one or two other places from which samples were sent me; this summary therefore includes *almost* every place, the name of which I have been able to ascertain from Lincolnshire round the north-east and north-west coasts to the Bristol Channel. There are one or two small places from which I still hope to receive samples, and I am also promised some from two places in the Isle of Man. These I shall report on subsequently.

I have obtained in all thirty-eight samples from twenty-nine towns, and samples in addition from Ogwen Lake, and Glanrafon Spring, two independent sources of supply also used. These comprise all the most important places which are visited by the inhabitants of the northern and midland counties, and I need scarcely say that some of the Welsh watering places and Scarborough are frequented largely by London visitors as well.

The total residential population of these twenty-nine places amounts, as nearly as I can estimate, to 230,000, and I think I am not far wrong in estimating the visiting population at any one time during the season at 130,000 more, and therefore, taking the same basis of calculation as in my previous summary* we have a total of 520,000 visitors in the course of the season making altogether three-quarters of a million of persons interested in the purity of the water-supply at these watering places. I will as briefly as possible collate the results of the analyses and point out the salient features of each supply.

In twenty-eight of the twenty-nine places there is a public supply. In this respect the figures compare favourably with the south and south-eastern watering-places, where there was a public supply in only twenty-six out of thirty-three towns. In fifteen places, viz., Bridlington, Scarborough, Whitby, Saltburn, Maryport, Morecambe, Barrow, Blackpool, Southport, Birkdale, Rhyl, Abergele, Pensarn, Penmaenmawr, and Barmouth, there is a constant and therefore in this respect satisfactory supply; while in two others, viz., Filey and Whitehaven the supply is constant except for part of one day in the week. In five places, viz., St. Anne's, Waterloo, New Brighton, Bangor, and Aberystwyth, my information states that the supply is not constant, and in the remaining eight places I have not been able to obtain any information on this point sufficiently reliable to justify its publication.

* See SANITARY RECORD, September 28, p. 197.

There are five places, viz., Bridlington, Filey, Whitby, Abergele, and Beaumaris where I have ascertained that private wells are used in addition to the public supply, and one place, Pwllheli, where there is no public supply at all, but I think the collective population of these last six towns does not exceed 30,000, and probably there are not more than 40,000 visitors during the season. Viewed as a whole, the supply of these northern watering places is more satisfactory than the supply of the southern and south-eastern ones referred to in my previous summary. The proportion of really first-class waters is not so high, but on the other hand the second-class waters are as a rule better specimens of their class than the second-class waters of the more southern coasts.

Taking the first class waters alone, it is of course difficult to sort them in the order of their merit, but I think Whitehaven, Penmaenmawr, and Beaumaris are perhaps on the whole entitled to rank first, while Barmouth, Morecambe, Poulton, New Brighton, Bangor, Southport, and Birkdale follow closely after. All of these are satisfactory waters. The points of complaint in any case are small. Thus, for instance, we find that at Whitehaven the supply is not constant on Fridays, and the filtration is inefficient; the Barmouth sample had a slight yellow tint due to the presence of iron; the Penmaenmawr water had a slight yellow tint and slight peaty taste; the Morecambe sample had minute traces of suspended clay, but was extremely soft, and remarkable for its low total solids; the Poulton supply was apparently identical with that of Morecambe; the Bangor water had minute traces of suspended iron, but in all other respects closely resembled the two latter supplies; the New Brighton sample contained more total solid matter, and a heavier proportion of nitrogen as nitrates than was contained in any of the samples reported on in these first-class supplies; the Southport water had a rather larger proportion of volatile matter than is desirable, and that from Birkdale was almost identical with it. These are nearly all the objectionable features which can be urged against any of these ten waters, while among the points in their favour is the extreme softness of a large number of them; the supplies of Whitehaven, Penmaenmawr, Barmouth, Morecambe, Poulton, and Bangor being all under 2° of hardness, while Birkdale, the hardest of them all, has only 8°. The total solids are very low in the Whitehaven, Penmaenmawr, Morecambe, Poulton, and Bangor waters, none of them exceeding five grains per gallon. The albuminoid ammonia in all these first-class waters is under ·0050 grains per gallon, and the nitrogen as nitrates is in every case but one below ·1000 grains per gallon.

These ten towns have a collective population of something like 80,000, and it is eminently satisfactory to find that these places which have the best water-supply are frequented by probably 250,000, or nearly half of the number of visitors whom I have estimated go to the northern watering-places, and who are thus supplied with water of such a character that it is difficult to complain of it.

There are fourteen places, viz. Portmadoc, St. Anne's, Whitby, Barrow, Pensarn, Abergele, Rhyl, Scarborough, Maryport, Waterloo, Aberystwyth, Bridlington, Blackpool, and Lytham supplied with water which must be considered as second class. Referring again, however, to my previous summary, it must be noted that as a general rule these second class waters are, as I have before remarked, superior to

the second class waters commented on in that summary; in fact nearly all these present waters belong to what may be called the upper division of the second class. It is more difficult to sort these in the order of their merit than it was to sort the first class waters, but comparing the whole of the results, the Portmadoc, Whitby, and St. Anne's waters are probably about the best, and these are followed pretty closely by Scarborough, Bridlington, Rhyl, Abergele, Pensarn, Maryport, Barrow, Aberystwyth, Waterloo, Blackpool and Lytham. Noticing now the general features of these supplies and the causes for which they are ranked lower than first class, the Portmadoc supply, although very soft and containing but little solid matter, has heavy traces of confervoid growth, and the oxygen absorbed is correspondingly heavy. The Whitby water was not by any means free from taste which, although it *may* be derived from the shale, is clearly an undesirable feature in a drinking water. The St. Anne's sample had an objectionable colour and an unpalatable taste, but if this water is, as seems probable, obtained from the same source as the Blackpool and Lytham supplies, there was an obvious improvement in the water between the dates when the samples from those places and that from St. Anne's were taken.

The Scarborough supply is different in its character from the Whitby one, as the sample contained about twice as much solid matter, and it also had a slightly astringent taste, but the albuminoid ammonia was very low; were it not for the taste it would have ranked higher than it does, although it is a comparatively hard water, the hardest in fact of all the public supplies in this series. The Bridlington supply, judging by the first sample I had, needed filtration; but a second sample which came some time afterwards, was free from suspended matter. In mineral constituents it bears a slight general resemblance to the Scarborough water—in nitrogenous constituents it is somewhat better. The Rhyl and Abergele samples both had a slightly objectionable colour, and a slightly offensive smell—the smell in the case of Rhyl appearing to resemble decaying leaves. The Pensarn sample had a similar smell, perhaps somewhat more marked, and it contained, in addition, traces of suspended matter. The Maryport sample was lower in total solids and was a softer water, but it showed a marked increase in the albuminoid ammonia, and also contained a quantity of nitrites; it needed filtration, and appeared to have been contaminated with peaty matter. The Barrow water would have ranked higher had it not been for the presence of many living animalculæ, and of some suspended matter, which showed imperfect filtration. In the Aberystwyth sample the albuminoid ammonia was ·0061; the colour, smell and taste were all objectionable, and there was a good deal of vegetable growth in it; the amount of oxygen absorbed was also very heavy, and the loss on ignition also high; on the whole this supply is at present unsatisfactory, which may be due to an accident which had happened to one of the pipes, but I understand arrangements and alterations are being made for an improved supply.

The Waterloo water, as regards nitrogenous compounds, was comparatively good, but it contained ·3740 nitrogen as nitrates, although the albuminoid ammonia was low, and it had a considerable amount of suspended matter, consisting mostly of chalk and clay. Efficient filtration would have placed it higher in the list. Blackpool and Lytham are both said to be labouring under difficulties at the present time, owing to the leakage of a reservoir, and certain alterations are, I believe, being made in consequence, but the works should be pushed on as rapidly as possible, as both the samples from Blackpool contained quantities of suspended matter, and a large number of bacteria and vibrions. The Lytham supply is apparently the same as that of Blackpool, and of the same character.

In this second class lot we have therefore fourteen towns, with a population of about 125,000, and perhaps 230,000 visitors, supplied with water which, although none of it is thoroughly bad, can only be described as second class. Perhaps the most noticeable feature in connection with the whole of them is that the defects or impurities of the waters are generally owing to inefficient filtration, or no filtration at all; but even Blackpool and Lytham, which are last on the list (possibly because of the leakage in the reservoir and the alterations which are being made), must be viewed as superior to the supplies of Felixstowe, Margate, or Broadstairs.

There are three places, viz., Filey, Saltburn-by-the-Sea, and Llandudno, where the supply is of a still worse character, and must be ranked as third class. It is right, however, to point out that the authorities of Llandudno are aware of the unsatisfactory character of their supply, and are constructing new works as rapidly as possible. At Saltburn, too, filtering beds are being constructed, and are, I believe, expected to be finished before Christmas. There was not much to choose between these three waters. The Filey one was perhaps the best, but that was full of suspended matter, needed filtration badly, and had an offensive smell. The Saltburn sample was of a dirty brown colour, had a large amount of suspended matter, and contained many living specimens of volvox. The Llandudno water contained the largest amount of solid matter of any of the public supplies referred to in this series, although it was not by any means the hardest. The salt, although only seven grains per gallon, was also the highest contained in any of the public supplies comprised in this series. The smell and taste were very offensive. I hope the new works will be completed before next season, for they are urgently required.

Thus we have three towns, with a population of perhaps 10,000, and probably 30,000 visitors during the season, supplied with water which is certainly of a very undesirable quality, and should be emphatically condemned by the authorities of any large town; although these supplies are not by any means so bad as those of Harwich, Yarmouth, and Walton-on-the-Naze.

One other public supply is of such a character that I refer to it separately; the Carnarvon water is satisfactory in every respect but one, and that is it contains traces of copper. As these papers are scarcely the place to enter into a discussion of the question as to the injurious or non-injurious effects of traces of copper on the constitution, I merely state the fact of its presence in the water, and leave those interested to deal with it or not as they think fit.

There is one place, namely, Pwllheli, where there is no public supply, but the inhabitants are supplied by wells and rain water only, and it is unusually satisfactory to find that in this case no great objection can be urged to the character of the two samples I have reported upon; these waters are better than some of the public supplies.

There are five places, namely, Beaumaris, Bridlington, Abergele, Whitby, and Filey, where wells or springs are used in addition to the public supply. The well at Beaumaris, from which my sample was obtained, is possibly contaminated with drainage matter, but it is better than the majority of private wells. The albuminoid ammonia in it was very low. Bridlington has some private wells, and the analysis of the sample I obtained from one proves it to be an undesirable water. At Abergele I had a sample from a private well, and it is perhaps enough, in summarising the results, to say that it contained crystals of urates, and swarmed with living animalculæ. Sewage is the only term which can be applied to such water. At Whitby I had a sample from a private spring (which I have, by mistake in my original report, called a private *well*). My assistant was informed that the spring was used for drinking purposes; in fact, the person who allowed him to get a sample said that he himself used it; but it is right to add that the medical officer of health has since stated, in the Whitby newspapers, that it is not so used; if that is the fact, it is so far satisfactory, but it would be more so if the spring were not used for any purpose, as concentrated sewage is the best description of the liquid obtained from it. From Filey also I had a sample from a private well, and this was said to be used for washing purposes 'only,' but the sooner it is closed the better it will be for those who use it. I can scarcely use any term stronger than concentrated sewage, and I am therefore compelled to say that it is the worst of nearly 100 waters I have examined in the course of this inquiry, taking rank even below the Sandwich Market Pump.

The supplies from Ogwen Lake and Glanrafon Spring are both worse than the public supply of Bangor.

Having concluded this summary I must now refer to two towns, namely, Newhaven and Seaford, on the water-supply of which I have already reported, and in reference to which I have received information not in my possession at the time I did so. I should mention here that, owing to difficulties in connection with the travelling arrangements, my assistant could not go to these two towns when he collected the other samples on the south coast.

NEWHAVEN.—On September 28 I reported on the water-supply of this town, and said that it had a constant supply of water, derived from wells, and I also gave the analysis of a sample received from Mr. Hobbs, the surveyor, to whom I had written asking him to send me one. In consequence of certain information I received, I subsequently sent an assistant to make inquiries on the spot, and I find that owing to a misunderstanding on Mr. Hobbs's part of the questions I asked, the statement as to the constant supply is not correct. There is a constant supply, but it is the property of the railway company, and is only available for their own premises, for the Newhaven Hotel and for a few adjacent houses, the rest of Newhaven being supplied by private wells.

My assistant obtained a sample from the railway company's supply on October 22, and the results were as follows:

	Grains per gallon.
Total solid matter	25·50
Loss on ignition after deducting combined carbonic acid	2·61
Lead and copper—none.	
Iron—slight trace.	
Chlorine calculated as chloride of sodium	4·56
Hardness before boiling, 12·2° (Clark's scale)	
,, after boiling, 4·5° ,, ,,	
Nitrogen as ammonia	0·0019
,, albuminoid ammonia	0·0033
,, nitrates	0·3920
,, nitrites	traces
Total nitrogen in these four forms	0·3972
Oxygen absorbed by organic matter	0·0120

The water had a very good pale blue colour, and was moderately hard, and had a flat smell and taste. The microscopical examination showed fragments only of vegetable matter. It is somewhat similar to the Scarborough supply, that is, a good second class water.

The sample, the analysis of which I published previously, was, Mr. Hobbs informed me, taken from his own well, and was unfiltered. The analysis of a fresh sample from the same well, drawn on October 22, gave results which were closely accordant. The water is not quite so good as that from the railway works, but the difference is mainly in an increase of 5° in hardness and an increase in the nitrates; the latter is, however, of comparatively little moment in this case, as it is a chalk well.

There are also other wells in the town, and my assistant obtained a sample from one, which, as far as he could judge on the spot, was likely to be one of the worst. The results were as follows:

	Grains per gallon.
Total solid matter	73·40
Loss on ignition after deducting combined carbonic acid	5·39
Lead and copper—none.	
Iron—slight trace.	
Chlorine calculated as chloride of sodium	22·23
Hardness before boiling, 26·3° (Clark's scale)	
,, after boiling, 7·2° ,, ,,	
Nitrogen as ammonia	0·0020
,, albuminoid ammonia	0·0027
,, nitrates	0·7000
,, nitrites	traces
Total nitrogen in these four forms	0·7047
Oxygen absorbed by organic matter	0·0120

The colour of the water was good, and the smell and taste satisfactory, but the microscope showed many bacteria and a large amount of other unsatisfactory matter. It will be noticed that the water is excessively hard, saline, and high in total solids, but the albuminoid ammonia is low, and so is the oxygen absorbed.

SEAFORD.—I reported on the supply of this town on September 21, and then stated that there was not a public supply. This is correct. I also gave the analysis of a sample which I had received from Mr. Wynter, the druggist there, to whom I had written on the subject; but on sending me a sample from his own well Mr. Wynter omitted to inform me that he had previously filtered the water. On this coming to my knowledge I sent an assistant, who, on October 22, collected three samples from Seaford. The first sample was obtained from Mr. Wynter himself, who stated that it was from the same well as the previous sample, but that this time it had not been filtered. The results were as follows:

	Grains per gallon.
Total solid matter	101·00
Loss on ignition after deducting combined carbonic acid	9·24

	Grains per gallon.
Lead and copper—none.	
Iron—traces.	
Chlorine, calculated as chloride of sodium.	44·23
Hardness before boiling, 29° (Clark's scale)	
,, after boiling, 10° ,, ,,	
Nitrogen as ammonia	0·0021
,, albuminoid ammonia . .	0·0036
,, nitrates	1·8900
,, nitrites	traces
Total nitrogen in these four forms . .	1·8957
Oxygen absorbed by organic matter . .	0·0060

The water had a fair colour, but a grossly offensive smell and taste; it did not show such a heavy loss on ignition as the previous sample from Mr. Wynter's well, and the oxygen absorbed was also lower; results which may possibly prove that the new filter was not of much use, but, on the other hand, the microscope showed that the water swarmed with living animalculæ, and contained decomposing animal remains. Clearly the well should be closed.

The other two samples obtained from Seaford by my assistant were from other wells there; the one marked H. from an hotel which is supposed to be supplied with very excellent water, and the one marked S. from a well which supplies some ten houses. The results were as follows:

	H. Grains per gallon.	S. Grains per gallon.
Total solid matter	87·20	121·20
Loss on ignition after deducting combined carbonic acid . . .	8·50	20·26
Lead and copper—none.		
Iron—very slight trace.		
Chlorine calculated as chloride of sodium.	37·32	76·40
Hardness before boiling, H., 25·7°; S., 18·6° (Clark's scale)		
Hardness after boiling, H., 13·2°; S., 8·5° (Clark's scale)		
Nitrogen as ammonia . . .	0·0020	0·0022
,, albuminoid ammonia .	0·0030	0·0026
,, nitrates	1·3300	0·9800
,, nitrites	traces	traces
Total nitrogen in these four forms .	1·3350	0·9848
Oxygen absorbed by organic matter.	0·0160	0·0140

The H. sample had a fair colour but most offensive smell and saline taste, and the nitrogen as nitrates is high; on the other hand, the albuminoid ammonia is low and so is the oxygen absorbed. The water was full of living organisms.

The S. sample had an unmistakable taste and smell of fæces, and its briny character renders it probable that it had had a good percentage of urinary salts added as well. Although the albuminoid ammonia is low, the water must be emphatically condemned.

The result therefore is to show that the Newhaven and Seaford supplies are far worse than I originally reported them to be, and it is my duty to acknowledge that I am indebted to the medical officer of health for East Sussex for courteously drawing my attention to the erroneous statements I had made as to the characters of the supplies. While acknowledging this, it is however somewhat unsatisfactory to have to add that in a letter dated October 21, which I received from him he declined to send me samples of water unless requested to do so by one of his authorities, and further assured me that 'at Seaford we have had *a little fun* over the water forwarded from there.' 'The chemist was sharp enough to filter it before it was forwarded, *and still more keen*, he used a new filter.' I regret that any medical officer of health should have 'a little fun' over a foul well, for if I interpret the Public Health Act aright, it is rather his duty to see that the use of the well is prohibited, than to find food for enjoyment in the fact that visitors are liable to be poisoned by impure water, because the steps which the SANITARY RECORD is taking to make public the contaminated state of polluted wells were, in the case of Seaford, nearly frustrated by such means as he describes. It would be interesting to know who are the 'we' that were amused by such a subject.

The results of the analyses of the samples drawn by my assistant are now however entirely at Dr. Fussell's service, and he will be able to take energetic measures at once to close the bad sources of supply, and I would advise him to lose no time in the matter.

'HOME, SWEET HOME.'*

BY ERNEST TURNER, F.R.I.B.A.

WE English are a home-loving, home-abiding people. The love of home is early instilled into the minds of her children by every English mother; and, go where we may—and I am bound to admit that there are very few places indeed to which some of us are not setting off every hour of every day—the spot to which our thoughts are always turning, the goal to which in the end our steps are always most gladly bent, is 'Home, Sweet Home'—*Sweet* Home? Yes. From the point of view of sentiment and feeling, always sweet. Unfortunately, this sentimental and emotional point of view, good and charming as it is, is not the only point of view from which, as a matter of fact, our homes have to be regarded. There is also the practical, sanitary, *nasal* point of view—the point of view which regards them not merely as centres of fond communion, but as places in which we have to live, and in which we wish to live *as long as possible*.

It is unnecessary to dwell upon the blessing of health; it is universally recognised as all-important to our enjoyment of life. Our conversation, like our lives, is certainly far from being always based on the strict rules of philosophy. But depend upon it, it is not without sound, sufficient, and most philosophical cause that our first question to each other every time we meet is, 'How d'ye do?' Now the object of the Registrar-General's returns is to answer this question, and to tell us *how we do*. And they show that in the United Kingdom one death in every five that occur is from some zymotic disease, disease which arises from neglect of proper sanitary precautions. One hundred and fifty thousand deaths—to say nothing of the enormous and incalculable amount of sickness resulting not in actual death, but only in severe present pain, and but too probably lifelong debility—arising annually from causes within our power to prevent, and to a great extent arising from the simple fact that our homes are *not-sweet* homes. Now, with these hard, incontrovertible facts staring us in the face, it is evident not only that hygiene is distinctly a matter alike of general and of individual interest, but that the sooner we all turn our attention towards effecting some improvement in the present condition of

* Read at the Congress of the Sanitary Institute of Great Britain. Leamington. 1877.

affairs the better. The chief causes operating against an ameliorated condition of affairs are imperfect legislation and administration, apathy, and ignorance; but the greatest of these is ignorance. It has been the policy of successive Governments, and probably the wish of the people generally of this country, to entrust local governing bodies with the care of the public health. This has been the case from the time of the passing of the first law relating to public health, an Act referring to the pollution of rivers passed in the reign of Richard II. in 1388. There is probably more to be said in favour of the system than against it; but here, certainly, apathy characterises the people in the election of representatives, and ignorance plays a prominent part in the administration of the laws. Let us not fail, however, to give honour where honour is due. There are towns to which this reproach does not apply—towns in which the executive are enlightened and energetic, and notably among the latter appear Brighton, Glasgow, and Leamington. Stratford-on-Avon, too, was energetic as early as 1552, in which year we find that Shakspere's father was fined for depositing rubbish in the public street, and in 1557 he and five other gentlemen were amerced in the sum of 4*d.* each for not keeping clean the gutter in front of their dwellings. This seems to have had a good effect upon Mr. Shakspere the elder, for in Collier's edition we read that in that same year he became a member of the corporation of Stratford, and was subsequently appointed one of four 'affeerors,' whose duty it was to impose fines on their fellow townsmen for offences against the by-laws of the borough. So Mr. Shakspere was fined no more for unhygienic practices, taking instead to the more pleasant as well as more creditable *rôle* of fining his neighbours for similar offences. In 1777 considerable severity was exercised in Clerkenwell. A man following the trade of a horse-slaughterer and boiler was, for causing a noxious vapour to arise from his factory, fined 100*l.*, sentenced to imprisonment for two years, and ordered to find security for three years after. It has been said that the principle of local self-government is the essence of our national vigour, and that local administration under central superintendence is the distinguishing feature of our government. Now, whether we agree with the former proposition or not—and there are no doubt some of both persuasions—there is at all events no use at this time of day in wasting time and energy in the vain attempt to struggle against the latter. Dealing, therefore, with institutions that exist, we must turn our attention to the remedy of evils and the removal of abuses, and follow up with a hearty co-operation with the powers that be. Evidently, then, it is of the utmost consequence that we should use every effort to secure the return of suitable men on our local boards. Mr. George F. Chambers, in his admirable digest of the laws relating to public health, offers some suggestions on this head, based upon his personal experience as chairman of a local board. He says: 'It is always desirable to have a lawyer (whether barrister or solicitor), an engineer, an architect, a medical practitioner, and a professional financier (whether banker or accountant). The technical knowledge which such men commonly possess will often keep a board out of difficulties.' That the officers of the board should be duly qualified for their work is, of course, a necessity, and I might, if time permitted, say much upon the advisability of the medical officer of health not being engaged in private practice, but devoting the whole of his time to the public service. Certainly it is an anomaly that at present an examination in hygiene should not be as necessary for the civil as for the military surgeon, and I am sure the medical profession will join me in the hope that ere long hygiene will be included in the curriculum of the schools, and in the examinations held by the colleges granting diplomas.

Very important duties necessarily devolve upon surveyors and inspectors of nuisances, and I trust the educational efforts made by the Sanitary Institute of Great Britain, and the examination to be held, will bring forth good fruit. As an example of how little is known of what is expected of an inspector, I quote an extract from the *Echo*: 'Recently the Alnwick Rural Sanitary Authority advertised for a new inspector of nuisances, and the other day met and proceeded to elect one. There were fourteen applicants, and "their letters, accompanied by testimonials," it is reported, "created much amusement." The office to be filled was a sanitary inspectorship, but the first applicant, judging from his letter, could hardly have had a correct idea of the duties appertaining to this office, for he gave as his "qualifications" that he had been "a pupil teacher, and could teach singing," upon which a gentleman present remarked that "the applicant would, indeed, be of some value if he could introduce harmony amongst the members of the board." Another applicant's "qualifications" were that he "was very steady and a good scholar;" and a third that "he was a travelling book agent, and could walk any distance;" while a fourth applicant modestly avowed that "in experience and ability he was second to none." What connection there may be between sanitary matters and keeping a public-house we fail to see; but a fifth applicant stated that he had been "for seven years landlord of the Blue Bell at Rothbury, and therefore he had a perfect knowledge of sanatary (*sic*) work."'

I may appear to be roaming from 'Home,' but be it remembered that whatever individuals may do to render their homes healthy, their endeavours may be entirely frustrated if, when the legislature has performed its part, the administrative authority fail to protect them from the neglect or *malfaisance* of their neighbours. In the main the sanitary problem is an educational one, and the condition of the people would be physically and morally improved if the elementary laws of health were taught in every school, and the necessity for, and duty of, observing them preached from every pulpit. Knowing in how many ways infection may be communicated and may spread from the poorer portions of our towns to the richer, one would think that, even putting aside philanthropy, greater efforts would have been made ere this to improve the condition of their dwellings.

We *have* done something, indeed we may, I think, say fairly and without boasting, we have of late years done much. The press, too, has now taken up the question, and, with its enormous influence brought to bear, our future progress should be still more rapid and still more satisfactory. Of what may be termed the technical press, probably a larger number of papers are at the present time engaged on this than on almost any other subject. But though these were of course the first to initiate

the movement, it is, I am happy to say, no longer confined to them. The great daily journals have one and all joined in it with vigour. There is, indeed, but one class of newspaper probably at this moment unrepresented in this hall, and that is the class of newspaper which avowedly addresses itself to the lower classes. Unfortunately this is in some ways precisely the sort of journal in which such topics might most advantageously be brought forward. If the leading journals of Seven Dials' society would only devote to the science of ameliorating the conditions of life, but one-tenth part of the space they daily fill with choice details of various ways in which—thanks in no small degree to their own pernicious influence—it has from time to time been violently taken away, Seven Dials' society would soon assume a very different complexion from that it wears at present. As it is, the impulse must come from above, and it is to the organs of the well-to-do classes that we must look for aid in improving the health, as in ameliorating the manners and the morals, of our slums. Some of these rookeries remind one of the description of Civita Vecchia, given by Mark Twain in one of his lectures, where he says, 'This Civita Vecchia is the finest nest of dirt, vermin, and ignorance we have found yet, except that African perdition they call Tangier, which is just like it. The people here live in alleys, two yards wide, which have a smell about them which is peculiar, but not entertaining. It is well the alleys are not wider, because they hold as much smell now as a person can stand, and of course if they were wider they would hold more, and the people would die. These alleys are paved with stone and carpeted with deceased cats, decayed rags, decomposed vegetable tops, and remnants of old boots, all soaked with dish water, and the people sit round and enjoy it.'

I must now claim your attention to a few remarks and hints upon the sanitary or rather unsanitary condition of our own homes, and how they may be improved. When I say our own homes, I mean the homes of that vast section of society that of necessity live in moderate rented houses erected by the speculating builder. Many excellent works have been written upon the subject of healthy houses, and my esteemed colleagues, Mr. Eassie, Mr. Rogers Field, and Mr. Baldwin Latham, have made valuable additions to this branch of sanitary literature, but too many writers seem to assume that all their readers are going to build their own houses. As a matter of fact, by far the greater number of people are compelled to take houses built by the speculator, and it is in these houses that the most dangerous sanitary defects exist. Architects are here often unjustly blamed, as with such houses they have generally nothing to do.

It does not at all follow that because some suburban abomination of variegated bricks and multiform tiles puts on a little pseudo-Gothic or imitation Queen Anne, or veritable *omnium gatherum* air, that its design has originated anywhere but in an ignorant builder's distempered brain, or its execution been governed by anything but that same ignorant builder's yet more distempered views of how to squeeze out of the minimum of unfaithful work the maximum of dishonest profit. The local boards have for some time been empowered to make by-laws with respect to the erection of new houses, but hitherto there has been great laxity and no uniformity of practice. The model by-laws with respect to new streets and buildings lately issued by the Local Government Board will probably be adopted by all local boards, and there is no doubt the result will be most beneficial. It is, however, with existing houses that I intend to deal, and to point out some of the chief defects through which the health of the inmates is likely to be injuriously affected, and how these defects may be remedied.

The first and most important point to be considered is that of drainage, as defects in this respect lead not only to general dampness, but to absolute contamination of air and water. Do not for a moment suppose I can tell you how to make a bad house a good house or how to sweeten an unsavoury and unhealthy house *without spending money*. This is what some people seem to expect; all I can do is to give you a few hints how to obtain the greatest benefit at the least expenditure. You may take it for granted that there *are* defects in all these houses, and that as a rule the waste-pipes are pointed at you like the pistol of the highwayman, demanding your money or your life. Of the two it is better perhaps to sacrifice the former.

Stoneware pipes have now quite superseded the old brick drains, and I assume the pipes to be laid from your houses. If not, demolish the brick drain at once, and lay glazed stoneware pipes, jointed in Portland cement. Improper jointing where the pipes necessarily run through the house, is frequently the cause of the ground becoming saturated with sewage. How, then, you will say, am I to ascertain whether my pipes leak, without taking up all my flooring. Thus; open the ground at the highest level of the drain, take out one length of pipe, and insert a bend, making the joint watertight. Next open the ground at the lowest level of the drain practicable outside the house, take out a length of pipe there, and securely stop up the end of the pipe next above the length you have taken out. Then pour water into the bend at the upper end of the drain, and fill it, *if you can*; if you *cannot*, you may be sure your drainage is defective, and you must seek for the weak places and remedy them.

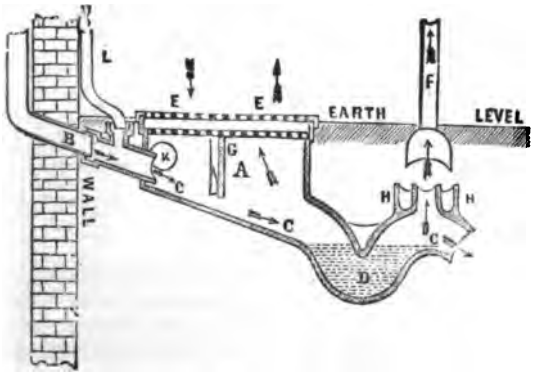
We next have to consider how to prevent sewer-gas from entering the house by means of the closets and wastes. The way to do this will vary in detail, according to the internal arrangements of the house and its position relative to surrounding buildings and to the sewer, but the general principles to be observed are two—ventilation and disconnection. First, then, it seems but reasonable that a barrier should be placed between the house and the sewer; this barrier or 'trap' must be constructed to obstruct as much as possible the passage of sewer-gas, but not to interfere with the free flow of drainage from the house to the sewer. The assurance that 'the drain is trapped' has led many astray; they have fancied themselves secure from the inroad of foul air, but have soon discovered their mistake, although at a loss to understand it. The reason of this is that too much reliance has hitherto been placed in 'traps,' and their action not generally understood. The trap most generally used is a water trap, which implies that the passage of foul gases is sought to be obstructed by the interposition of a certain quantity of water between the place where they are generated and the house. Having no time for experiments, I must ask you to accept as a fact, the statement, that although water will act as a barrier to gas, it is by no means an impassable barrier, and that under certain conditions, a considerable quantity of gas

will pass through it. A good practical illustration of this fact occurred some time since at Ryde, Isle of Wight. The town lies on the slope of a hill, and the inhabitants of the houses in the upper part simultaneously noticed a strong smell of coal gas. This was at first difficult to account for, but it was eventually found that a defective gas main in the lower part of the town was contiguous to a defective sewer, and thus the gas passed upwards through the drains, the traps, and into the houses. Ventilation of the pipes then is necessary, as well as the water trap. Rival tradesmen have lately been attacking each other with considerable acrimony respecting the relative advantages of their different systems, and the priority of patents. I can assure you that if you wish to know the merits of their respective appliances, they are at all events not *understated* in the advertisements and prospectuses. The strife, however, is useful, as at any rate it ventilates the subject, but it reminds one of the case of Herr Breitmann when he came to grief on his 'philosopede' and the doctors of the town, each having his particular speciality, met in consultation:

Und dat no man shouldt pe shlightet,
Or dreatet ash a tunce,
Dey 'greed to dry deir sysdems
Oopon Breitmann—all at vonce.

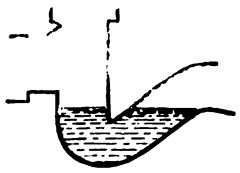
The diagrams figured below show some of the simplest and best methods introduced, the aim of each being to maintain a current of fresh air through the drain and soil pipes. In the Edinburgh Air Chambered Sewer Trap—Diagram I.—D represents the water barrier, A a chamber under a grating at the level of the ground through which the sewer gas

DIAGRAM I.



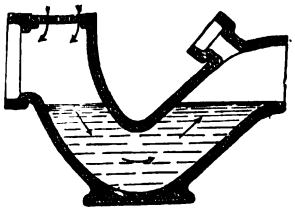
evolved from the water in the trap passes into the open air. G is a diaphragm for the purpose of deflecting the evolved gas and causing it to pass out at the grid. Fresh air is admitted at E and flows through the drain and up the soil-pipe B, which is carried above the roof and left open at the top. L represents a rain-water pipe, which is further intended to serve as a duct for the wastes from sinks, baths, etc. This part of the system I advise you not to adopt where it is possible to get the pipe entirely disconnected, as I shall show you presently. The pipe F is placed on the sewer-side of the trap, is carried also above the roof and left open, and relieves the trap from pressure of gas. Another good trap is Buchan's, represented by Diagram II. The principle is somewhat similar, but here the gas evolved from the trap is diluted with fresh air, the flow of air being through the drain and up the soil-pipe as before. An inexpensive form of trap (Weaver's), constructed on the same general

DIAGRAM II.



principles as the last is shown by Diagram III. It will be found as a rule that with any arrangement of this sort the air flows in at the grating at the ground level and up the soil-pipe, but occasionally under certain conditions the action is reversed. The trap should not be placed close under a window. An

DIAGRAM III.



extracting ventilator may be placed upon the top of the soil-pipe, the effect of which is, of course, to produce an upward current. There are many sorts, Buchan's, Braby's, Banner's, Brewer's, Boyle's, of which I prefer Boyle's, as it does not revolve, and is not so likely to get out of order as some others. The ventilating pipes often put to soil-pipes are too small; it is best to carry up the pipe the same size as the soil-pipe well above the roof, and away from dormer windows or chimneys. Let nothing discharge into the soil-pipes but the closets. Strong lead soil-pipes are the best; iron pipes corrode, and are difficult to make perfect at the joints. A few words as to the closet apparatus. Your plumber will probably tell you that a 'pan closet' is the best. Don't believe him; a pan closet is an abomination, a disgusting contrivance for retaining filth, and polluting the air of our dwellings; indeed, the offensive effluvium arising from this apparatus is often mistaken for sewer gas. If you have one in your house, get rid of it at once, and have a valve closet fitted. Take my word for this; I have seen hundreds. Do not use D traps under the closet apparatus; the best appliance is a cast S trap. The D trap is bad enough when properly made, but it is generally improperly made, and then it is worse. Underneath the closet apparatus on upper floors, as well as underneath the bath, you will find a tray or 'safe' for the purpose of preventing any water from leakage or overflow damaging the rooms below; these have waste pipes which, in the case of the former, is almost universally carried into the D trap. Cut this off, and take it through the external wall, leaving it projecting a few inches from the wall, with a copper-hinged flap to prevent draught, or conduct it into the sink waste pipe I am about to describe.

More sewer gas is introduced into our houses through the waste pipes from sinks than by any other medium of communication. The remedy is simple. Cut off all direct communication be-

the movement, it is, I am happy to say, no longer confined to them. The great daily journals have one and all joined in it with vigour. There is, indeed, but one class of newspaper probably at this moment unrepresented in this hall, and that is the class of newspaper which avowedly addresses itself to the lower classes. Unfortunately this is in some ways precisely the sort of journal in which such topics might most advantageously be brought forward. If the leading journals of Seven Dials' society would only devote to the science of ameliorating the conditions of life, but one-tenth part of the space they now fill with choice details of various ways of wife-beating—thanks in no small degree to their own pernicious influence—it has from time to time been recently taken away, Seven Dials' society would soon assume a very different complexion from that it wears at present. As it is, the impulse must come from above, and it is to the organs of the well-to-do classes that we must look for aid in improving the health, as in ameliorating the manners and the morals, of our slums. Some of these nuisances remind one of the description of Civita Vecchia given by Mark Twain in one of his lectures, where he says, 'This Civita Vecchia is the finest nest of dirt, vermin, and ignorance we have found yet, except that African perdition they call Tangier, which is just like it. The people here live in alleys, two yards wide, which have a smell about them which is peculiar, but not entertaining. It is well the alleys are not wider, because they hold as much smell now as a person can stand, and of course if they were wider they would hold more, and the people would die. These alleys are paved with stone and carpeted with deceased cats, dead dogs, decomposed vegetable tops, and remnants of old boots, all soaked with dish water, and the people sit round and enjoy it.'

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rooms, is next in importance to good drainage and water-supply; it is intimately connected, indeed inseparable, from the questions of warming and lighting. These subjects require to be treated at greater length than the brief time at my disposal admits of. I would say generally that no ventilator that has ever been introduced will of itself satisfactorily perform the twofold duty of admitting fresh air and extracting foul in ordinary dwelling houses. Ventilation is necessarily a system which, to be effectual, requires a combination of appliances, differing according to the exigencies of each case. For ordinary rooms I have found no system so easily and economically applied to existing houses, and so satisfactory in its results, as vertical tubes for the admission of air, in combination with outlet valves into the chimney at the level of the ceiling. This method, intelligently applied, together with a stove that draws the air direct from outside the building, warms it and throws it into the apartment: either the Galton stove or one of the many modifications thereof, will be sufficient to secure purity of air in any ordinary room. There is a ventilating gas bracket (Slater's patent), to which I would also call your attention as being a simple and valuable aid to ventilation. Other considerations, such as the prevention of any accumulation of matter capable of decomposition, general cleanliness, the abolition of wall papers, bed hangings, unnecessary carpeting, etc., are within the scope of my subject, but I fear I have already exceeded my time.

In conclusion, I hope that the few hints I have had the opportunity of offering you to-day may have some practical efficacy in showing how you may all do at least something towards making Home—*sweet* home.

THE
SANITARY RECORD.
FRIDAY, NOVEMBER 9, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

THE ARTISANS' DWELLINGS ACT AND THE HEALTH OF BRISTOL.

NO amount of ingenuity or sophistry can persuade those possessing sound knowledge on the subject, that an excessive rate of mortality can co-exist with satisfactory sanitary condition, and those who have had the means of informing themselves as to the excessive mortality which prevails in some parts of all our large towns must feel disappointment that out of London and Birmingham so little earnest intention to adopt the provisions of the Artisans' Dwellings Act has yet been shown. Such apathy in a matter of the most vital importance to the health of our town populations, and indeed of the nation at large, reflects discredit alike on ratepayers, medical officers of health, and local sanitary authorities—all of whom have power to originate improvement schemes under the Act, and power to appeal to the confirming authority (in most instances the Local Government Board) in case representations of unhealthiness are disregarded.

Bristol is one of the seven largest English towns, and is also a town which, up to the present time, has not prepared or adopted any improvement scheme under the Act, and we propose to consider a few of the circumstances which explain the causes of this omission, and will assist us in apportioning any blame attaching to such omission. Under the 4th section of the Act, any 'twelve or more persons liable to be rated to any rate out of the proceeds of which the expenses of the local authority under this Act are made payable,' may make a representation to the local medical officer of health, as to the unhealthiness of any area within such jurisdiction. It appears that early in August last, the medical officer of health of the city of Bristol received a memorial numerously signed, not only by ratepayers, but by guardians of the poor of the Bristol Union, setting forth that two areas within the city were unhealthy within the meaning of the Artisans' Dwellings Act. The medical officer of health has since made an inspection, in accordance with the Act, and has formally signified to the town council of Bristol and to the memorialists that he is unable to report either of the areas as 'unhealthy.' Such a decision on the part of the medical officer of health, if accepted as final, has so important a bearing upon the future usefulness of the Act that we propose to consider in some detail the memorial of the guardians, and the reply of the medical officer of health.

The memorial set forth two areas comprising streets, courts, and alleys, in which the low condition of the health of the population is said to be evidenced not only by the high death-rate, but by the large extent of sickness prevailing therein; this is attributed to the 'closeness and bad arrangement and condition of the houses within such areas, and to other sanitary defects.' The population of the two areas is estimated at 403 and 500 respectively, and it is stated that during 1876 the death-rate was equal to 47 per 1,000 in the first and to 50 per 1,000 in the second area. Further, that within the first area 149 applications for poor-law relief were reported by the relieving officers during 1876, of which 107 were on account of sickness, and that 58 cases of fever, principally typhus, have occurred since November 1876; in the second area 144 applications for relief were entered, 37 being on account of sickness, and five cases of fever occurred therein during the first quarter of this year. The memorialists, while expressing their confidence that there are many other areas within the ancient city of Bristol that are unhealthy within the meaning of the Act, specially

complain of these two areas as 'fruitful of sickness, misery, pauperism, and crime.'

Before noticing critically the grounds on which Mr. David Davies refuses to certify these areas as unhealthy, within the meaning of the Act in question, a few words on the recent mortality statistics of the city of Bristol may not be out of place. During the twelve years that have elapsed since the Registrar-General began to publish special vital statistics of our largest towns, the death-rate in these towns has showed a decided decline. The extent of this decline varies remarkably in the several towns, and it may be noted that it has been especially large in Liverpool, Leeds, and Sheffield. The death-rate in Bristol may, on the other hand, be said to have remained stationary during the twelve years; it was equal to 23·7 per 1,000 per annum during the six years 1865–70, and to 23·4 during the more recent six years 1871–76. The mortality in the second period was little more than one per cent. lower than in the preceding period. The mortality in Liverpool in the latter of these two periods was 14·4, and in Manchester 7·5 per cent., below that which prevailed in the earlier period. Undoubtedly both Liverpool and Manchester were and still are far more unhealthy towns than Bristol, but with regard to evidence of sanitary progress this latter city also compares unfavourably with London, as the mortality of the metropolis during the six years 1871–6 was more than 6 per cent. below that which prevailed in the six preceding years. The fact that the mortality in Bristol has not increased during the past twelve years, although the population is so much more dense, is to a certain extent satisfactory, but in the face of declining death-rates in other large towns it may well be asked why Bristol should be satisfied with a stationary death-rate. Infant mortality was almost identically the same in the last three years 1874–6, as in the three preceding years, and the rate of mortality from the principal zymotic diseases showed an actual increase. A new sanitary impetus appears to be needed just now in Bristol, and no other course is so likely to supply this impetus as the liberal application of the provisions of the Artisans' Dwellings Act to the worst courts and alleys of the city.

We will now proceed to notice Mr. David Davies's reply to the memorial. In the first place he states that one of the areas complained of is situated within the registration sub-district of St. Paul, and that the rate of mortality for the whole of the sub-district during 1876, did not exceed 22·8 per 1,000 and was only 0·3 below the average rate in the whole city. Mr. Davies appears, however, in his calculation to have entirely overlooked the fact that in Bristol, during 1876, no less than 11·6 per cent. of the deaths were recorded in workhouses and hospitals, none of which are situated in this sub-district; and assuming that this sub-district of St. Paul contributed its fair quota of deaths to these institutions, it is necessary to increase this death-rate by 11·6 per cent., which raises it to 25·4 per 1,000, or 2·8 in excess of the average rate in the city, and even this rate probably somewhat understates the true death-rate of the sub-district. Having thus proved that the death-rate in the whole St. Paul sub-district is excessive, let us examine the figures for the two small areas, specially complained of in the memorial. The memorialists adopted as the basis of their calculations the enumerated numbers of the population in 1871, which are probably not very different from the actual numbers at the present time, as the blocks were then fully occupied, and may be presumed to be so still. If there is any alteration it is probable that the population is now less than it was; if this be the case the rates of mortality stated by the memorialists would be understated. Mr. Davies says the numbers in 1871 are not now applicable, but he neither gives his reason for rejecting them, neither did he, during his inspection, ascertain the actual numbers, which should have formed an essential part of his house-to-house visitation.

Again, as regards deaths in these areas during 1876, Mr. Davies reports them to have been 34 in the two areas, instead of 40, as stated by the memorialists, and he repudiates the idea of calculating a rate of mortality for so small a population (of the number of which he confesses that he has not informed himself) for a single year. We agree so far with Mr. Davies as to the importance of not limiting such an inquiry as this, for so small an area, to a single year, and think that it would have been judicious if he had ascertained the number of deaths and their causes within these areas during the past five years. If the high rate in 1876 could have been proved to be exceptional, he would have had some good ground for the decision at which he arrived. Taking the 1871 population, in want of more recent numbers, and adopting Mr. Davies' number of deaths in 1876, it may be calculated that 34 deaths in a population of 903 is equal to a rate of 37·7 per 1,000, and, raising this rate by 11·6 per cent. for the average proportion of institution deaths, the rate of mortality in the two areas complained of becomes 42·1 per 1,000. It is indeed strange if this rate cannot be accepted as indicative of an unhealthy area. At any rate, these facts afford such strong presumptive evidence of unhealthiness as to demand more definite refutation than Mr. Davies has attempted in his reply to the memorial, in which he displays that utter disregard of the statistical aspect of the question so common with 'the old-fashioned orthodox sanitarians,' with whom he says he disagrees.

Much of the property within the areas complained of are of the back-to-back type, a large number of the houses having but two rooms; and it is stated that in many of the houses the privy is actually situated within the lower of the two rooms. The outbreak of typhus in this area is admitted by Mr.

Davies, and while he asserts that the fever was imported, he admits that it here 'found a population most susceptible of the disease,' but rejects the conclusion that the character of the house accommodation was in great measure the cause of this susceptibility. Although Mr. Davies refuses to report the areas as unhealthy (partly let us hope through his want of information as to their mortality statistics), he condemns the structural defects of the courts, and their want of light and ventilation, but does not recognise that these are the very sanitary defects of which the Artisans' Dwellings Act was intended to facilitate the removal. With regard to the privy nuisance, Mr. Davies admits that in some cases these necessaries are not 'sufficiently isolated from the residents' own rooms,' but he considers even these in 'a sanitary sense superior, more isolated and more conducive to a sense of decency, than the privies in some blocks of modern houses.' In conclusion he expresses an opinion that the removal of these courts, etc., would simply be driving out the inhabitants to concentrate and produce possibly greater evils in another quarter. Such a theory is hardly worth serious consideration in the present day. If sanitary progress is to be a reality, sanitary authorities must not only be prepared to root out the old plague spots and fever nests from all our large towns, but to accept the responsibility of preventing the possibility of similar evils arising in other quarters. The municipal authorities of Liverpool and Glasgow, in demolishing the worst parts of those large towns in recent years, have not created worse evils elsewhere, and it is to be hoped that the town council of Bristol will not be deterred from adopting the Artisans' Dwellings Act in the worst parts of their city by the groundless fears of their medical officer of health.

It may be trusted that the town council will see the necessity for further investigating the mortality statistics of the areas dealt with in the memorial, which appear to point most conclusively to a sanitary condition that should be pronounced unhealthy within the meaning of the Act. In order that Mr. Davies may be in a better position to advise his sanitary authority on the probable advantages of adopting an improvement scheme, we would suggest that he should study the excellent statistics of the Glasgow improvements, compiled by Dr. Russell, and also the vital statistics relating to the Peabody Buildings and to the improved dwellings erected by the Metropolitan Association and other associations carrying on similar work.

It may be useful to point out that section 15 of the Artisans' Dwellings Act provides that, when a medical officer of health has made an official representation to the effect that in his opinion an area is not an unhealthy area, the ratepayers may appeal to the confirming authority—in this case the Local Government Board—and that upon the ratepayers giving security to the satisfaction of that authority for costs, the confirming authority shall appoint an independent medical officer to inspect the area, and to report whether it is an unhealthy or not an unhealthy area. Section 15 of this Act should be carefully studied by all ratepayers who are really in earnest about applying the provisions of the Act, and who do not meet with support from their sanitary authority. The necessity for such an appeal can scarcely, we should imagine, arise in Bristol, but the provision for it immeasurably increases the power of the Act for furthering sanitary progress in our large towns.

THE SOUTH LONDON WATER-SUPPLY.

THE metropolitan water companies appear to be doing their best to put a term to their existence as irresponsible bodies charged with the duty of supplying four millions of people with one of the prime necessaries of life; for South London is now affording an illustration—such as we have already had from every other district of the metropolis within a comparatively short period—of the utter inapplicability of the present water-supply system to the circumstances of a dense, vast, and growing population.

It may be remembered that in the SANITARY RECORD of July 20 last we called prominent attention to some statements which had been published in the *Builder* relating to the proceedings of a water company at Chelsea, and to some facts which had reached us about the same time from the parish of Rotherhithe respecting the management of the water-supply system in that district. In Chelsea the water company, in default of the payment of rates in advance by the occupiers of a crowded street, had taken upon themselves the responsibility of cutting off the supply of water in a house occupied by eighteen persons, the result being that the premises were converted into a fever den, the stench arising from the place being truthfully described as 'horrible.' There had, of course, been no reference to the sanitary officer for the district—the water company, in the usual way, having acted on its own responsibility, and with the most perfect indifference to the dangerous results which might ensue for the public health. If, as a consequence of the proceedings of this company, the whole district had been ravaged by an epidemic disease, encouraged and stimulated in its action by the absence of water, the company would have been absolutely free from any legal penalty or disability whatever, thanks to the enormous power for evil which Parliament has foolishly entrusted to the arbitrary hands of these private corporations. In Rotherhithe, it will be remembered, the state of things to which we referred as having happened during the height of the past summer was even worse than at Chelsea, for in one part of the East End parish no water at all had been obtainable for several days, and even on the occasion

of two fires which had occurred no water could be obtained until some time after the arrival of the fire-engines—the danger from the spread of these fires being thus greatly augmented.

In a vast city like London such a condition of affairs is very serious, and indeed alarming. But now we have accounts of even a worse state of things in South London; for not only have there been similar complaints of scarcity in the supply of water in certain districts in that part of the metropolis, but the quality of the supply has been very seriously called in question. A correspondent, writing to the *Daily News* some days ago, first called attention to the alarming scarcity of the water-supply in parts of South London, where the condition of affairs, he remarked, would enable some idea to be formed of 'London without water.' For some days, this correspondent stated, 'hundreds of houses' in his neighbourhood had been 'without an inflow of water, and it was a painful sight to witness the large number of men, women, and children parading the streets with pails, pans, and pitchers, to get what water they might from some chance source.' Matters, it seems, at length came to such a pass that an assault was made upon some empty houses in the Alderminster Road, Bermondsey, in the rear of which there was some water stored in tanks. It is scarcely likely that this water was fit to drink, yet it was carried off with avidity by the waterless inhabitants of the surrounding neighbourhood. The supply, however, in tanks which had been left standing for some time, and into which, of course, the periodical flow of water had ceased, was, of course, soon exhausted. The next object of assault was a disused pump, which had been locked to prevent any use being made of its dangerous water. The public need, however, was so great that the handle was forced, and hundreds—thousands, indeed, it was stated—of persons filled their pans and pails, and carried this unwholesome and dangerous water to their homes.

Now it is more than probable that incalculable harm has been wrought by this one circumstance alone. Even if only used for cooking purposes, the water would have unwholesome effects. But there can be little doubt that in hundreds of cases the water was drunk, for the reason for the closing of the pump would be known in all likelihood to only a few, and perhaps the ill-effects which would probably ensue from drinking it would not be referred to its actual source at all. What, however, can the inhabitants of a district do when their whole supply of water is cut off? It is really difficult to know what could be done unless large supplies of water could be obtained from outside. But the water-supply in the districts of London is never too abundant, and would certainly be altogether inadequate for supplying the sudden and large needs of one or more districts altogether deprived of their normal supplies. It is alleged on behalf of the water company that the lack of water in South London was due to some alterations in the main occasioned by the necessity which existed for severing the connection between the 30th and 36th main (filtered and unfiltered water) at West Hill, Wandsworth. This alteration had taken place—so the engineer of the company stated—'in deference to the wishes of the Board of Works for the Wandsworth district, and the Government water examiner, Colonel Bolton.' But no definite reason is assigned for the step, and the public are certainly entitled to a more explicit explanation than the one which has been volunteered. It was at least reasonable to expect that if it was found necessary to stop the water-supply of a large and densely populated district, some notice ought to have been given to the inhabitants and some preparations made for providing for their wants during the stoppage of the regular supply. Such a notice however, would, of course, have entailed some expense for printing, and have thus tended to diminish the amount available for 'dividends' to the private persons of whom the water company consists. It seems, however, that the present instance of serious irregularity in the supply of water to South London by no means stands alone, for a correspondent of the *Daily News* states that in one part of the district the public have 'long suffered' from the annoyance caused by a bad supply of water.

The scarcity of water in South London is however, it appears, not the only cause of grievance; for very serious complaints are being made concerning the quality of the supply. One correspondent of a daily contemporary, writing from Bermondsey, states that 'the water at all times is extremely bad,' and that he has 'frequently found large insects in the water from the tank quite a quarter of an inch long, necessitating the possession of a filter'—a luxury, however, which must obviously be beyond the means of the poorer classes of the inhabitants. The latter, however, equally with the better classes, are called upon to pay their rates—and are punished, in a way which we have already shown, in default of paying in advance the inequitable demands of the companies—and they are therefore entitled to have pure, well-filtered water brought to their houses. 'Amongst the many rumours,' writes one correspondent, 'as to the cause of the present "drought" in South London is one as to "the Government coming suddenly down upon the company for supplying unfiltered water."' In the face of the suspicion which naturally fastens on the company in consequence of the fact that 'large insects' are frequently found in the tanks of the consumers, this 'rumour'—which it must be confessed has the undoubted appearance of truth—ought to be either confirmed or denied. The engineer of the company, who volunteered the statement that the dangerous inconvenience occasioned to the public was owing to the removal of the connection between the main of filtered and the main of unfiltered water 'in deference to the wishes' of

the Board of Works for the Wandsworth district and of the Government water examiner, might surely have been a little more explicit. Where the supply of water intended for a district is not abundant, there is, no doubt, a great temptation for the companies to supply their consumers with unfiltered water. But this is just one of the many dangers to which the public are subjected, in consequence of the present most unsatisfactory system of water-supply in the metropolis.

There is, we must repeat, but one really effectual remedy for the evils of this system, and that is the supercession of the private companies who supply us with one of the most vital necessities of existence, and the placing in the hands of a public body the supply and control of the entire system of water-carriage. So long as the present system is allowed to remain in existence, so long necessarily will the public have to incur the inconvenience and danger with which the people of South London have just been afflicted. It is satisfactory, we suppose, to know that the Metropolitan Board of Works—a body which does nothing without the most careful deliberation—still has the subject 'under consideration.' We would, however, venture to express the hope that these weighty deliberations may soon bear fruit in the shape of some practical good to the ratepayers of the metropolis.

Notes of the Week.

THE village of Eaton Socon, near Bedford, is about to be lighted with Hearson's patent automatic gas-lamps.

THE Kingston Guardians and Rural Sanitary Authority, Surrey, have increased the salary of Mr. James Edgell, their clerk, from 225*l.* to 300*l.* per annum.

AT Bungay, Suffolk, a meeting of owners and ratepayers has been held, and a resolution passed that it is expedient to form a local board.

THERE were sixty-eight applicants for the appointment of engineer and surveyor to the Corporation and Urban Sanitary Authority of Salford, at 700*l.* per annum.

MESSRS. GWYNNE AND CO. have now in their factory a pair of very large pumping-engines, each capable of pumping 100 tons of water per minute 17 ft. high.

THE Maesteg local board of health have requested Mr. Cousins, of Swansea, to report on the schemes for proposed waterworks for Cwmdu.

WORKS of drainage have just been completed in Glen-of-the-Downs village, near Kilpedder, county Wicklow, by Mr. J. Saunders, contractor, of Bray.

WORKS of drainage are about to be carried out at Dalkey, from the plans and specifications of Mr. R. Walsh, C.E.

EXTENSIVE works of sewer-construction have been carried out at Rutherglen, near Glasgow, by Mr. M'Gill, contractor.

THE salary of Mr. Jonas Proctor, Surveyor to the Corporation and Urban Sanitary Authority of Bolton, Lancashire, has been increased from 300*l.* to 400*l.* per ann.

THE Barton-upon-Irwell Guardians and Rural Sanitary Authority, Lancashire, have been authorised by the Local Government Board to borrow 19,200*l.*, repayable in twenty years, for the drainage of Flixton and Urmston.

THE Town Council of Evesham have at length decided to adopt Messrs. Gotto and Besley's scheme of water-supply. The cost will be about 8,000*l.*, and the water will be brought from Broadway by gravitation.

THE Abergavenny rural sanitary authority have adopted an amended plan for the drainage of Llanfoist, prepared by Mr. James, surveyor, and adjourned the further consideration of Messrs. Gotto and Besley's report as to the best mode of draining Cantreff and Long Barn.

THE Scarborough Town Council have decided to purchase the undertaking of the Waterworks Company, and have authorised a committee to prepare a bill and deposit the same in Parliament, and to negotiate terms with the directors of the water company.

ON the 27th ult. several gentlemen, deputed by the general body of exhibitors at the late Sanitary Exhibition at Leamington, presented to Mr. C. L. Marsh, the curator, a testimonial in recognition of the valuable services rendered by him in making and superintending the general arrangements for the show.

AT the weekly meeting of the Metropolitan Board of Works, it was resolved that two schemes under the Artisans and Labourers' Dwellings Improvement Act for the Essex Road area of the parish of Islington, and for the Bowman's Buildings area in Marylebone, should be forthwith prepared.

AT a meeting, on the 23rd ult., of a joint committee, consisting of representatives of the Cockermouth and Workington Urban Sanitary Authorities and the Cockermouth Rural Sanitary Authority, it was decided that Messrs. Pickering and Crompton, of Whitehaven, should be appointed the engineers to carry out the scheme of water-supply.

DR. CAMERON, of Dublin, in addressing the members and students of the Royal College of Surgeons of Ireland, last week, on the 'Pathology of Contagion,' dwelt on the manner in which foul and infected air is often brought by the insuction of kitchen fires into dwellings, and in urging that every house should rest on impervious foundation, recommended a mixture of asphalte and sand, as better, from a certain point of view, than a stratum of concrete.

DR. PRICE JONES, the medical officer to the Kingston-on-Thames Rural Sanitary Authority, has reported to that Board that the water of the Lammas well, on the property of Mr. Money Wigram, at Esher, should not be used for drinking purposes unless well filtered. Mr. Want, one of the Esher Guardians, stated that the water of the well in question was always drunk by Her Majesty when staying at Claremont. The Board resolved to send a copy of the analysis made by Dr. Price Jones to Mr. Money Wigram.

MR. P. H. HOLLAND, one of the Government inspectors, has held an inquiry at Hampstead, respecting a resolution of the burial board of that parish, declaring it expedient that burials in the parish churchyard and the new ground attached thereto should be wholly discontinued, the board having at a cost of about 26,000*l.* provided a cemetery on the outskirts of the parish. At the close of the inquiry the inspector intimated his intention to recommend that there should be no interments except in private graves.

HYGIENE.

THE public desires health, but does nothing to preserve it. Its opinions on this point are commonly puerile when they are not dangerous. There is no liberty of conscience in astronomy, in chemistry, physiology, or physics: why should it not be the same in hygiene? There also are principles and truth which it is our mission, says Lacassagne, to seek out and to make known. If you render a man healthier you make him better. That is why Rousseau said, Hygiene is not a science; it is a virtue.

WATER FROM THE CHALK.

IT appears that the town of Basingstoke is capable of furnishing a supply of the purest water from the chalk far in excess of the quantity required. Mr. Welchman states that Basingstoke and Greywell (a place six miles nearer London) coupled, can furnish sixteen millions of spring water per diem. Basingstoke also possesses a considerable advantage over other places near London that supply spring water, in that pumping would be quite unnecessary, as Basingstoke is many feet higher than London, and the water would run through a main by gravitation alone and at a nominal cost.

DEFECTIVE HOUSE DRAINAGE.

IN a letter addressed to the Hornsey Local Board, a resident complains that in certain residences there the soil-pipe is carried inside the houses, generally down the kitchen wall, the joints in the pipes being made with putty daubed with black paint; that the drain-pipes are carried under the houses, are not bedded in concrete, and with open joints, they being also used for subsoil drainage; and that there are no disconnecting traps between the houses and the main-street drain, and no provisions for ventilation. In a reply made to his remonstrances, a statement is made to the effect that there are 'no joints better than putty joints for soil-pipes.' This is a most extraordinary discovery we should imagine, and we can only believe that it is the result of some mistake in putting the question.

SMALL-POX IN THE ISLE OF MAN.

THE Lieutenant-Governor has laid an important statement before the legislature, showing the necessity for a Compulsory Vaccination Act, the provision of hospital accommodation, and the appointment of a general sanitary officer for the island,—three measures which he advocates. Since July 8, last, to the date hereof, there have been 102 reported cases. Of this number twenty-seven had been vaccinated, sixty-two never vaccinated, one case of inoculation, and twelve vaccinated after incubation. Among the unvaccinated there have been twenty-five deaths; while from amongst those attacked, and with whom the vaccination had taken, only three have died. The number of deaths among the unvaccinated persons attacked has been at the rate of about one in two and a half, as against a death-rate of one in thirteen amongst those who had at some period of their life been vaccinated. Dividing the vaccinated cases into two heads, viz., primary vaccination and revaccination—the following results are shown: Two out of the three vaccinated persons who have died were aged respectively seventeen and twenty-five, and had not been vaccinated since young; the third case was that of a baby, and death is reported to have ensued by convulsions in teething. Among revaccination cases no deaths have been reported. The outbreak of the disease may be traced to a visitor who was removed to the hospital, and it is supposed the contagion was conveyed by a woman connected with the hospital, who herself caught the small-pox. The first attacked in Douglas were those who had never been vaccinated. This gave the disease a hold that it might not otherwise have obtained; but, once established in the most crowded part of the town, it has spread from family to family with considerable rapidity.

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

WATER ANALYSIS.

(*To the Editor of the* SANITARY RECORD.)

SIR,—I have read with much interest Mr. Wigner's articles of the 'Water-Supply of Seaside Watering-Places,' and also his reply in your issue of October 19, to Mr. Jackson's queries, and I have gained from them many valuable hints. One or two other questions have, however, suggested themselves to me, to which, if it be not trespassing too much on Mr. Wigner's kindness, I should like to have answers.

1. What precautions are necessary in order to get accurate results with the indigo process for the estimation of nitric acid? I have tried that process according to the directions in Sutton's 'Volumetric Analysis,' but failed to get concordant results. The circumstances of the experiments being, so far as I could see, exactly similar, the same known quantity of nitrate of potash decolorised, in different experiments, very different quantities of indigo solution.

2. What process does Mr. Wigner use for the estimation of nitrites?

3. Does the same amount of combined nitrogen correspond to the decoloration of an equal amount of indigo; whether the nitrogen be in the form of nitric or of nitrous acid? In other words, is the nitrogen as nitrous acid to be added to or subtracted from the amount as nitric acid found by the indigo test?

4. How much water is it necessary to evaporate in order to examine the residue microscopically, and by what method? In his analysis of the Town Pump, Cromer (SANITARY RECORD, September 21), Mr. Wigner states that 'the residue showed crystals of urea, as well as alkaline urates.' Urea, as I believe, is converted into carbonate of ammonia on boiling, especially if decomposing matters be present, so that any urea present in a sample of water would be found as 'free ammonia.' Now the amount of nitrogen as ammonia given as present in the water in question is only ·0018 grains per gallon, which, supposing it all to exist in the form of urea, would be equal to only ·00385 grain of urea. Is it possible therefore to detect by the microscope less than a grain of urea in 250 gallons of water, each gallon containing moreover 146 grains of other solid constituents? Or is urea not completely decomposed in either stage of the ammonia process? If so, this circumstance must greatly detract from the value of that process.

H. FRANKLIN PARSONS, M.D.

6 Banks Terrace, Goole,
October 30, 1877.

THE TITLE 'INSPECTOR OF NUISANCES.'

(*To the Editor of the* SANITARY RECORD.)

SIR,—The correspondence of the past few weeks upon this subject is, for some reasons, to be regretted, not only because of the acrimony imported into it, but particularly because of the want of unanimity it shows to exist between medical officers of health and inspectors of nuisances. It appears to me that the real question at issue lies deeper than the name by which the latter officers shall be known; an issue which, by nature of the appointments and the summary of duties contained in the General Order of November 11, 1872, was to be expected—that of the respective positions and authorities of these two officers. Many have had reason to feel these as indefinite and unsatisfactory. Now that this question has been broached, it should be thoroughly discussed.

I take it that the inspector of nuisances does not, or but imperfectly, recognise the authority of the medical officer of health, nor does he recognise the medical officer of health's office to be superior to his own; but

rather that these two are separate and independent offices, having almost separate and independent duties pertaining to them, and that the one is equally important with the other. This position is encouraged by the bearing of sanitary authorities, by the more frequent opportunities inspectors have of displaying their authority, and by the disproportionate and larger salaries that inspectors commonly receive. Indeed, neither the General Order nor the Public Health Act clearly show that the inspector is to be generally subservient to the medical officer of health, but rather that the former is to report to the sanitary authority, and that the latter is to advise the sanitary authority, and that the former has access to a second opinion which he is not bound to act upon.

This is an unfortunate result of the present sanitary organisation, for it leaves the three positions of sanitary authority, medical officer of health, and inspector of nuisances anomalous and almost irresponsible. As a consequence, many good works which might be accomplished are but imperfectly done; and by uncertain methods the public are harassed in a manner that they do not understand.

Without further discussion of the present sanitary organisation it will be sufficient to compare other services with this; to show that the office of medical officer of health, to become an efficient one, must partake more, if not entirely, of the character of a State appointment. The excise and inland revenue appointments are made by the State. In former days, surveyors of taxes were locally appointed and paid by salary and percentage. This not being found satisfactory, the service was reorganised, and appointments have since been made and salaries paid by the State. These services for the protection of State property, another service have we for the protection of the subject—the police. In this we have a chief appointed by magistrates in quarter session assembled, to whom he is responsible and to whom he makes his reports. Inferior appointments and promotions are in his hands.

These being for the protection of public property and public peace, can we deduce from them what organisation there should be for the better protection of the public health? Many opinions may be held upon this; what may be here detailed is apparently what we are tending to.

Sanitary 'divisions' should consist of a combination of sanitary authorities, be presided over by a committee representative of these authorities, and by a medical officer of health appointed permanently by this committee. To secure the independence of this officer, both in regard to his neighbours and the local authorities, this appointment should also be vested in the Local Government Board. 'Divisions' should be divided into 'subdivisions,' over which 'surveyors' or 'sanitary inspectors' should be appointed, and 'subdivisions' should be composed of 'districts,' each with its local sanitary authority and 'sanitary officer' or inspector of nuisances, as at present existing. The appointment of 'sanitary inspectors' and 'sanitary officers' should be made by the medical officer of health. The duties, as is obvious, would be that the sanitary officers should inspect their districts for the discovery and abatement of nuisances, etc., and be responsible for the performance of all instructions given by the sanitary authority or medical officer of health. The sanitary inspectors should be responsible for the amount and efficiency of the work done in their subdivisions, and for the maintenance of the standards and methods of sanitation. They should also be able to advise the sanitary officers, and have such a knowledge of engineering as to enable them to survey and lay out drains, and do such minor work. The medical officer of health would direct and superintend the whole, and observe such other duties as now fall to his lot. Thus the sanitary organisation would be that of a sanitary police, in which the representative committee would correspond with the court of quarter session, the local sanitary authority with the petty session, the medical officer of health with the chief constable, the 'sanitary inspector' with the police superintendent, and the 'sanitary officer' with the police officer. Such an organisation, with a well regulated scale of pay, would place these respective officers in their proper positions, and, moreover, their ranks would be recruited from such spheres as are best adapted for the performance of the duties. The titles suggested would indicate the grades, and remove that which is now objectionable in the present title of inspector of nuisances.

R.

Sanitary Inventions.

THE LIEBIG COMPANY'S EXTRACT OF MEAT.

A REMARKABLE evidence of the progress in the art of cookery is afforded by the increasing demand for the numerous concentrated essences of meat, which have stood the test of practical use. Among the best, if not the most meritorious, of these preparations are the productions of the Liebig Company, made according to Baron Liebig's instructions, from the finest fresh meat.

The facilities afforded by such easily available material for the preparation of made dishes, sauces and soups have obtained for them a well-deserved and constantly increasing reputation among all good housewives. It is, however, in large institutions where their merits are most gratefully appreciated, as many patients and convalescents could testify.

The Liebig extract is decidedly economical in use, the peculiar process of manufacture retaining all the finer qualities of the meat, the vast scale of the operations of the Company giving it every opportunity of offering the articles they produce at a price below that charged by smaller competitors for inferior specimens. Dietetic value, good flavour and economy are thus well-proved characteristics of the Liebig Company's extract of meat. Wherever used their value is appreciated, and they are almost invariably used permanently. They may be relied upon to keep good for any length of time, in all climates. A word of caution, in conclusion; the jars containing the genuine article are distinguished from imitations by a label bearing a *fac-simile* of the signature of Baron Liebig, in blue ink.

A NEW VENTILATOR.

OUR attention has been directed to a new patent self-acting exhaust ventilator, just introduced by the well known firm of Messrs. Braby and Co. of Euston Road, which, while possessing certain advantages, has one particularly recommending itself to our favourable notice—we refer to suitability of design, a very pleasing step in the right direction. The manufacturers have called in the aid of a gentleman, well known for his artistic knowledge, who has produced a series of designs suitable to every style of architecture, rendering the apparatus, what all such contrivances might be, both useful and ornamental. These suitable and harmonious designs form an agreeable relief to the eye, especially after seeing the variety of ugliness in the construction of ventilators which forces itself upon the notice of the most casual observer in any large town.

The hideous monstrosities disfiguring many public and private buildings have for a long period set us pondering upon the sad lack of originality possessed by the manufacturers of ventilators. Purchasers of ventilating apparatus, who, though desiring some means of procuring the first sanitary requisite—fresh air—yet hesitate to disfigure a building, constructed with every detail harmoniously worked out, by the erection of a veritable scarecrow on the most prominent part of the structure, will do well to see these careful and elaborate drawings, showing the various forms which the appliance under notice assumes according to the special circumstances to which it is intended to be applied.

The apparatus differs from those of a similar class in being automatic in all positions and under all conditions. Varieties may be had, consisting of two, four, or more

vertical pipes, arranged at equal distances round a centre; in either case the series of tubes communicates with the space to be ventilated by one central conduit for the escape of vitiated air. Each tube has a partition dividing it into a semi-cylinder. One of these spaces thus consists of a semi-cylinder, closed at the top but opening below into the larger tube, supplying the air from the building. An open space, running from top to bottom, a slit, in fact, is left. Midway in this is a division formed of two plates of metal, joined at right angles, and presenting the angle to the outer part of the circle.

These divisions pass from top to bottom of the semi-cylinder. One of the tubes composing the ventilator, if seen from the side, would present to the observer two openings 22½ degrees from the main central division, each opening would show a blank space for a short distance towards the centre of the pipe, but with two channels between the circumference and the centre, formed by the angle of the perpendicular division, extending the length of the tube. An obvious advantage of such an arrangement is that one ventilating tube provides for four directions of the wind. A plate of metal is interposed at equal distances between the tubes when only two are used; a like interval, but arranged so as to point to the centre when three or four tubes make up the system. In every case the apertures for permitting the escape of foul air point toward the centre of the circle.

The central tube opening to the building meets the other at an angle calculated to assist and accelerate the upward current. It is almost impossible for the wind to travel in any direction which will not put the apparatus in action, and from the peculiar and carefully studied arrangements of the details it affords a ready passage for upward currents, but as effectually prevents a down draught under any circumstances. Snow and rain cannot render it useless, as is the case with ventilators depending on mechanical action.

This system may be, and has also, we believe, been successfully applied to the ventilation of railway carriages and soil pipes. All sizes may be had, from 18 in. base, and 6 in. pipes, up to 72 in. base and 24 in. pipes. The larger sizes are particularly adapted for very large areas.

Notices of Meetings.

SANITARY INSTITUTE OF GREAT BRITAIN.

THE first examination of surveyors and inspectors of nuisances took place on Monday, October 29, at the rooms of the Medical Society of London. Eight candidates presented themselves, five of whom were successful in obtaining certificates of competence, namely, Mr. H. M. Robinson, surveyor, Ulverston; Mr. J. Parker, surveyor, Bridgwater; Mr. F. Booker, inspector of nuisances, Bradford; Mr. W. S. Prebbles, inspector of nuisances, Blackburn; Mr. Thomas Blanchard, inspector of nuisances, Evesham. Fifteen candidates have already entered their names for the next examination.

SOCIETY OF PUBLIC ANALYSTS.

THE next meeting will be held on Wednesday, the 14th inst., at Burlington House, Piccadilly, at eight o'clock, to consider and discuss a report from the council as to the working of the Sale of Food and Drugs Act, in order to enable a formal reply to be made to some inquiries by the representative of the German Government, who propose to introduce an Adulteration Act themselves. The following papers will also be read:—'On Milk Analysis,' by J. Carter Bell, F.C.S.; 'On the Analyses of Five Mineral Waters,' by Otto Hehner, F.C.S.; and other business. The following gentlemen will be proposed for election as Members, viz.:—J. H. Martin, F.R.M.S., Analytical Chemist, London; J. W. Gatehouse, Public Analyst for Bath; James Whitla, Public Analyst for the counties of Armagh and Monaghan.

The following gentlemen are candidates for admission as members: Louis Siebold, F.C.S., Manchester, analytical and pharmaceutical chemist; Thomas Jamieson, F.C.S., Aberdeen, public analyst and chemist to Aberdeen Agricultural Association; Thomas W. Drinkwater, F.R.P.S., Edinburgh, analytical chemist; and James John Day, F.C.S., Derby, chemist to the Midland Railway Company.

C. HEISCH, G. W. WIGNER, } Hon. Secs.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

BURBERY, Joseph Holland, Esq., has been elected Chairman of the Kenilworth Local Board and Urban Sanitary Authority.

CLARKE, Dr. William Fairlie, has been elected a Member of the Southborough Local Board and Urban Sanitary Authority, Kent, vice Wylde, resigned.

CLINCH, William, Esq., has been appointed Treasurer to the Clinch, Guardians and Rural Sanitary Authority, vice James Witney Esq., deceased.

COLLINS, F. A., Esq., has been appointed Treasurer to the Stokesley Guardians and Rural Sanitary Authority, Yorkshire, vice Cooke, resigned.

COX, Mr. Edmund, has been appointed Inspector of Nuisances for the No. 2 Sub-District of the South Stoneham Rural Sanitary District, vice Scorey, whose appointment has expired.

EMMERSON, John Bolton, M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the Howdon Urban Sanitary District, Northumberland, vice Hadfield, deceased.

KENWARD, Mr. Edwin, has been elected a Member of the Uckfield Local Board and Urban Sanitary Authority, Sussex, vice Sinden, resigned.

LANGLEY, Mr. George, has been appointed Clerk to the West Ashford Guardians and Rural Sanitary Authority, and to the Assessment Committee, vice Norwood, deceased, at 95*l.*; 35*l.*, and 35*l.* per ann., respectively.

LLOYD, Mr. William Allwood, has been re-appointed Inspector of Nuisances for the Thornton Urban Sanitary District, Yorkshire, at 40*l.* per ann., for three years.

MEREDITH, John, M.D. Univ. Edin., L.R.C.S. Edin., has been re-appointed Medical Officer of Health for the Wellington Urban Sanitary District, Somersetshire, for one year.

PARRY, Mr. Joseph, has been appointed Surveyor and Inspector of Nuisances to the Bredbury Local Board and Urban Sanitary Authority, Cheshire, vice Axon and Buckley, resigned, at 65*l.* for the first year.

RAWSON, Edwin Elsworth, M.R.C.S. Eng., L.R.C.P. Edin., L.S.A. Lond., has been re-appointed Medical Officer of Health for the Thornton Urban Sanitary District, at 27*l.* per ann., for three years.

SKUTT, Mr. Richard, has been appointed Collector to the Kenilworth Local Board and Urban Sanitary Authority.

SPEIGHT, Mr. Thomas, has been elected a Member of the Cleckheaton Local Board and Urban Sanitary Authority, upon the annexation of the Hamlet of Scholes.

THORNE, Thomas Henry, Esq., has been appointed Treasurer to the Kenilworth Local Board and Urban Sanitary Authority.

TREPASS, Mr. Frank, has been appointed Inspector of Nuisances for the Kenilworth Urban Sanitary District.

WHITE, Walter, L.R.C.P. Edin., and L.M., L.R.C.S. Edin., has been appointed Medical Officer of Health for the Darton Urban Sanitary District, Yorkshire, at 20*l.* per ann.

WHITELEY, Mr. George, has been elected a Member of the Cleckheaton Local Board and Urban Sanitary Authority, upon the annexation of the Hamlet of Scholes.

WILSON, George, M.D. Univ. Edin., has been appointed Medical Officer of Health for the Kenilworth Urban Sanitary District.

WOOD, Mr. William, has been appointed Inspector of Nuisances for the Bosmere and Claydon Rural Sanitary District, vice Thompson and Sporle, whose appointments have expired.

VACANCIES.

BERWICK-UPON-TWEED URBAN SANITARY DISTRICT. Inspector of Nuisances: 80*l.* per ann., for three years. Application, 14th inst., to J. C. and R. Weddell, Clerks to the Authority.

CUMBERLAND. Public Analyst: 21*s.* per analysis, for the first hundred, 10*s.* 6*d.* per analysis for the second hundred, and 5*s.* per analysis beyond, per ann., 2*l.* 12*s.* 6*d.* for each quarterly report, 21*s.* for compulsory attendance, 3*d.* per mile each way for travelling expenses, and 21*s.* per analysis of water. Application, 20th inst., to T. H. Hodgson, Clerk of the Peace, Carlisle.

NEWPORT RURAL SANITARY DISTRICT, Monmouthshire. Inspector of Nuisances: 150*l.* per ann. Application, 12th instant, to W. Downing Evans, Clerk to the Authority.

NOTICE.

THE SANITARY RECORD *is published every Friday morning, and may be ordered direct from the Publishers. Annual Subscription, 17s. 4d.; free by post, 19s. 6d.*

Original Papers.

ON THE WATER-SUPPLY OF SEASIDE WATERING-PLACES.

BY G. W. WIGNER, F.C.S.

(*Continued from p. 296.*)

BEFORE commencing the South-west of England watering-places, I will take this opportunity to refer to a few places I have been obliged to miss from their geographical order.

ALDEBURGH is a small town on the Suffolk coast, with a population of some 2,000. It is said to be supplied with water partly from a constant water-works supply, and partly from wells. The samples I have received were kindly forwarded to me by Mr. Ing, chemist, of Aldeburgh, and consisted of one said to be taken from the waterworks supply, and one said to be taken from what is called the Town Pump. The sample from the waterworks supply gave the following results :

	Grains per gallon.
Total solid matter	132·20
Loss on ignition after deducting combined carbonic acid	14·72
Lead and copper—none.	
Iron—slight trace.	
Chlorine calculated as chloride of sodium	89·27
Hardness before boiling, 22° (Clark's scale)	
,, after boiling, 10° ,, ,,	
Nitrogen as ammonia	0·0017
,, albuminoid ammonia	0·0030
,, nitrates	0·8650
,, nitrites	0·0030
Total nitrogen in these four forms	0·8727
Oxygen absorbed by organic matter	0·0120

This is a most undesirable drinking water. It had an offensive smell of leaves, and the microscope showed that it was full of vegetable contamination, which appears by the fourteen grains of volatile matter lost on ignition to be excessive in amount. The colour was strong blue, but taking all the facts into consideration, the water was so salt as to be briny in taste. It cannot rank higher than as a bad third-class water.

The sample from the Town Pump gave the following results :

	Grains per gallon.
Total solid matter	59·40
Loss on ignition after deducting combined carbonic acid	8·43
Lead and copper—none.	
Iron—slight trace.	
Chlorine calculated as chloride of sodium	19·25
Hardness before boiling, 24·5° (Clark's scale)	
,, after boiling, 14·8° ,, ,,	
Nitrogen as ammonia	0·0051
,, albuminoid ammonia	0·0080
,, nitrates	1·7600
,, nitrites	traces
Total nitrogen in these four forms	1·7731
Oxygen absorbed by organic matter	0·1000

This sample had a very objectionable yellow green colour, and a most offensive smell. The proportion of oxygen absorbed was excessive. The total solids and salt were lower than in the sample from the town supply, but the albuminoid ammonia and the nitrates are both high. The results of the microscopical examination showed that the water swarmed with monads, bacteria, and vibrions, and contained animal remains in addition. It is shocking to think of such sewage being used in preference to even third-class water, but I suppose the saline character of the waterworks supply is the cause. There are few towns so badly supplied with water as Aldeburgh is.

ROTTINGDEAN is a small place on the chalk formation, a few miles from Brighton. I did not obtain a sample in time to report upon it in its proper place, but have since been favoured with one drawn from the public well by G. B. Longstaff, Esq., M.B., while he was staying there. Mr. Hollands, the superintendent of the Brighton Corporation Waterworks, has also courteously sent me a sample from the same well, together with one from a private well. The place is said to have a population of 800, and has probably not more than 500 visitors during the season. There is no public supply by a company, but numerous private wells; the water from these, however, is found to be so saline in taste, that the people obtain their drinking water from a public well, said to be nearly 200 feet deep, and I should therefore think it is entirely in the chalk. The situation of the well is reported to be suggestively near to a farm-yard. I place side by side the figures of the analyses of the two samples from the public well :

	Oct. 2. Grains per gallon.	Oct 6. Grains per gallon.
Total solid matter	58·10	56·80
Loss on ignition after deducting combined carbonic acid	4·17	4·13
Lead and copper—none.		
Iron	rather heavy traces	slight trace
Chlorine calculated as chloride of sodium	24·97	24·57
Hardness before boiling, Oct. 2, 18·6°; Oct. 6, 18·7° (Clark's scale)		
Hardness after boiling Oct. 2, 7·4°; Oct. 6, 9·9° (Clark's scale)		
Nitrogen as ammonia	0·0009	0·0035
,, albuminoid ammonia	0·0028	0·0043
,, nitrates	1·1340	1·2990
,, nitrites	trace	0·0030
Total nitrogen in these four forms	1·1377	1·3098
Oxygen absorbed by organic matter	0·0160	0·0360

The worst feature which strikes the eye in considering the above results, is the high proportion of nitrates, and this might perhaps be overlooked in a deep chalk well if ordinary circumstances did not point to a different origin, but although I tested the samples at different times, and without even knowing they were from the same well, I found that both had an unquestionable smell and taste of sulphuretted hydrogen and excreta. The colour of both was a dirty green, and there were traces of suspended matter. The salt also was very high. The microscopical examination disclosed the presence of three minute hairs in the few drops I could examine, and of one or two fragments of cotton fibre and other organic remains.

Now, none of these results are consistent with the fact of the nitrogenous matter really coming from the chalk; on the contrary, they directly point to some surface drainage soaking through. Therefore, despite the low albuminoid ammonia, I must condemn this as a bad third class water, probably not absolutely dangerous now, but liable at any moment to become so.

The sample taken from a private well near the

police station at Rottingdean, gave the following results:

	Grains per gallon.
Total solid matter	401·00
Loss on ignition after deducting combined carbonic acid	31·22
Lead and copper—none.	
Iron—very slight trace.	
Chlorine calculated as chloride of sodium	323·51
Hardness before boiling, 30·6° (Clark's scale)	
,, after boiling, 16·1° ,, ,,	
Nitrogen as ammonia	0·0175
,, albuminoid ammonia	0·0050
,, nitrates	1·6100
,, nitrites	trace
Total nitrogen in these four forms	1·6325
Oxygen absorbed by organic matter	0·0240

This water had a milky green colour and an offensive smell. The taste, of course, was briny, as ¾ of an ounce of salt per gallon would hardly fail to make it so, and it is no wonder that the inhabitants cannot drink the private well water, of which this is a specimen. The microscopical examination showed many animal remains entangled in the crystals, showing that the contamination was at any rate not entirely due to infiltration of sea water. Perhaps it is scarcely necessary to speak of prohibiting the use of such a compound for drinking purposes, for I scarcely think anyone would venture to drink a second glass of it, but as I believe that contaminated water is quite as injurious when used for boiling vegetables or meat in, as it is if used for actual drinking, the well, in my opinion, should be at once closed, in order to prevent its use even for cooking purposes. Such a step is the more necessary because the water from the public well is carried round and *sold*, and therefore the stronger is the temptation on the part of those who own these private wells to use the cheaper although more dangerous liquid.

ABERYSTWYTH.—I referred to this place in the number for October 26,* when I alluded to the fact that the proprietor of the *Aberystwyth Observer* said that my sample was contaminated by drainage matter having passed through a hole in the pipe. He has since forwarded me a sample which he says was drawn from Simon's Well, Llanbadarn Flats; this he states is the main source of supply, and he further informs me that the laying down of new pipes from there to Aberystwyth will be completed in a month. Under these circumstances I analysed the sample he sent me, and the following are the results:—

	Grains per gallon.
Total solid matter	11·90
Loss on ignition after deducting combined carbonic acid	2·87
Lead and copper—none.	
Iron—slight trace.	
Chlorine calculated as chloride of sodium	2·29
Hardness before boiling, 2·8° (Clark's scale)	
,, after boiling, 2·5° ,, ,,	
Nitrogen as ammonia	0·0042
,, albuminoid ammonia	0·0019
,, nitrates	0·0530
,, nitrites	0·0030
Total nitrogen in these four forms	0·0621
Oxygen absorbed by organic matter	0·1100

The microscopical appearance was quite satisfactory, and the colour of the water good, but there was a decidedly unpleasant taste of decaying leaves. The chemical results are superior to those of the previous samples, although the high proportion of oxygen absorbed and the smell prevent it from ranking as a first-class water.

Even these results, however, are of no value if the main is not properly relaid at once, so that the town is supplied with the water direct from the spring, and not contaminated *en route* with drainage.

RHYL.—I referred to this town in the number for October 12. I have since received a communication from the medical officer of health for Rhyl, Abergele, and Pensarn, which proves that I was correct in supposing the supplies of the three places to be derived from the same reservoir, and some correspondence has also taken place in the London newspapers on the subject. I previously condemned all these supplies as second-class waters, containing much decomposing vegetable matter. Since that time the medical officer of Rhyl has forwarded me another sample and some information from which I learn that the gathering ground includes some peat and plough land, which may be the cause of the vegetable contamination. The water is also allowed to run through old mains, which were used to convey a supply previously used before the present one was adopted, and these mains are said to be in consequence heavily coated with lime, deposited by the old supply.

	Grains per gallon.
Total solid matter	9·90
Loss on ignition after deducting combined carbonic acid	2·20
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	1·76
Hardness before boiling, 4·0° (Clark's scale)	
,, after boiling, 4·0° ,, ,,	
Nitrogen as ammonia	0·0023
,, albuminoid ammonia	0·0033
,, nitrates	0·0800
,, nitrites	0·0040
Total nitrogen in these four forms	0·0896
Oxygen absorbed by organic matter	0·0300

Chemically these results show very little improvement on the previous sample; the albuminoid ammonia has decreased, and the nitrates have increased in more than corresponding proportions. The colour, smell, and taste were all as bad as before, but the microscopical results are somewhat better. The filtering beds are evidently insufficient or out of order.

In my next paper I shall report on the supplies of Douglas and Ramsey, in the Isle of Man, Clifton, Portishead, Weston-super-Mare, Lynton, Ilfracombe, and Westward Ho.

THE DISSEMINATION OF DISEASE BY PAWNBROKERS.

AFTER the public has been so thoroughly aroused to the danger of infectious diseases being spread by tainted water-supplies and ill-ventilated drains, it is a thankless task to have to point out that there is another source of danger to the public health which is not only highly alarming, but very difficult to control. The danger lies at the pawnbroker's, and especially at such establishments which are located in poor neighbourhoods. The following cases, which have been inquired into very carefully, will show at once what the danger is.

* See SANITARY RECORD, No. 174, p. 261.

CASE 1.—Two sisters lived in a small village near London, but nearer to a country market town. One of these sisters was seized with the small-pox and died. The survivor, who was next to destitute, took some of the deceased's clothes and the sheets and blankets off the mattress on which she died to the pawnbroker of the market town in question. The sheets were refused, as they were evidently dirty, but the blankets and the apparel were taken in. At the same time, on the same day, A. Z., a workman, pawned his jersey at the same place. He took that jersey out five days afterwards and within a fortnight was also seized with the small-pox of which, till then, there had been no case in the town. He recovered; but the outbreak of which his case was the commencement led to three deaths.

CASE 2.—A servant, in service at Holloway, paid a visit to her mother who lived in the eastern district of London to spend her week's holiday with her. During her stay there she pawned a velveteen jacket, which she redeemed the day before she returned to service. Soon afterwards her mistress's baby was seized with the small-pox, and mother and child died of the disease. The servant escaped.

CASE 3.—A whole family was smitten with small-pox, and placed under the charge of a nurse appointed by the medical officer of the district. This nurse, who appears to have been a veritable 'Mrs. Gamp,' pawned divers articles of clothing belonging to members of the family to procure drink with. The disease broke out in another family, living more than a mile and a half distant from the infected household, who had also pledged articles of clothing at the same pawnbroker's on the same day, and at the same time, and entailed the death of the husband.

CASE 4.—A gentleman, holding a clerkship in the city, was in want of money and pawned his overcoat. This gentleman lived some distance from London in a detached house quite isolated. No other house is within a quarter of an hour's walk. His family had no intercourse with other people except with some tradesmen and a relative. His overcoat had been used to lay on the children's bed, two girls and a baby of eighteen months sleeping together. After he had redeemed his coat and put it to its former use, the children were smitten with scarlet-fever of a very virulent form. Yet there were no other cases of scarlet-fever anywhere in the locality, but it was raging in the neighbourhood where he pawned the article.

CASE 5.—This was very similar to Case 4, but with this difference that two persons redeemed some underclothing at an establishment situated in a locality where scarlet fever was prevailing and both persons were seized with it soon afterwards, though they lived some distance from the infected locality and from each other, and did not come together again after their meeting at the pawnbroker's before they were laid up.

Now in reference to these instances Case 1. speaks for itself. A.Z., the workman, knew the sisters in question, and when he heard of the death of one of them, and remembered he had seen the other at the pawnbroker's the same day the death occurred, he naturally came to the same conclusion that cannot but force itself upon everybody's mind.

Case 2 also rests upon its own merits. The servant had not been anywhere where small-pox had broken out, but confessed she had pawned her jacket, and subsequent inquiries proved she had spoken the truth.

In Case 3, however, the chain of evidence was so strong as to be conclusive. The matter was discovered in a very remarkable manner. The nurse in question had a cousin. This cousin, a very respectable, hard-working woman, was sent by a member of the family, in whose house the small-pox subsequently broke out, to redeem the clothing which had been pledged. At the pawnbroker's there was some dispute about the ticket, on which one of the figures of the number had been altered. The number was 346 or 347. The pawnbroker thought it was 347, both numbers being inscribed 'coat.' The cousin, however, knew the coat, and said 347 was not the one; and, in fact, 346 turned out to be the right article, both pledges being in the name of 'Ann Smith.' The cousin took the coat home to the pawner, and in due course the small-pox broke out in the family. Some time afterwards the nurse called upon her cousin—who had no communication with her for months—in great trouble of mind. She had been called to account for some of the things she had pawned, and had redeemed them all except one, for which she had no more money. She begged her cousin to lend her the necessary sum, but her cousin had no money by her. She promised, however, to give it to her in the afternoon. The nurse was much disheartened in consequence, as she had to go to a distant part of the town, and would not be able to return in time. Thereupon the cousin told her to leave the ticket with her, and she would redeem it. This the nurse gladly did, and went her way. The number of the ticket was 347, and referred to a coat pledged by 'Ann Smith,' which, it need scarcely be said, is a favourite pseudonym, the surname supplied by the pawner, the christian name by the pawnbroker. The incident at once struck the cousin; and when the nurse called, she plainly taxed her with being the cause of the death of her acquaintance. Nothing could be more conclusive than this. Here a coat, No. 346, is pledged; on this coat, another, No. 347, belonging to a patient suffering from small-pox, is placed, and the owner of No. 346, who did not go to the pawnbroker's himself to redeem it, but sends another person, becomes infected with the disease and dies.

Cases 4 and 5 also rest upon their own merits; but in both instances the sufferers concerned, after carefully considering the matter, were forced to the conclusion that the fever came from the pawnbroker's. The medical man who attended Case 4 was so completely non-plussed to account for the outbreak, that the unhappy father was once or twice on the point of telling him his suspicion, but naturally did not like to do so.

These are positive instances of what the least consideration shows must be a very great danger, and which go far to explain the persistency with which an infectious disease clings to a poor neighbourhood, and the origin of the outbreak of an epidemic in a locality where it has been hitherto absent, and between which and other infected districts there is apparently no direct connection. No better means could possibly be devised to spread such infectious diseases as are communicable by clothing than the pawnbrokers' shops. They are in truth veritable Exchanges of Disease, and the poorer the people, the more disease prevails amongst them, the livelier is the communication between infected and uninfected clothing and bedding. Nor is the danger limited to the lower classes. It exists in proportion to the connection between the lower and

the upper classes. People have no idea what strange customers the pawnbroker has. There is, for instance, the footman or butler, who has pawned his own coat or one of his master's; and there is the tolerably well-to-do artisan, who lives in lodgings, and places his Sunday suit in pledge for safety sake. Some people also send their linen and other things to the pawnbrokers when they leave town for a week or fortnight, for the same reason. In fact there is no limit to the ramifications disease advances by from the pawnbroker's.

But if the danger is plain the remedy is not quite so evident. The pawnbrokers, who have been consulted on the matter, do not see their way to obviating the danger. They acknowledge its existence, but say with some force that as regards the very poor the medical authorities ought to take more precautions. This may be. But though the medical men might send round a list of the persons in their district suffering from infectious diseases to the local pawnbrokers, still, as goods are pledged as often as not in false names, the measure would be fruitless. To the proposal that they should disinfect all apparel passing through their hands, the pawnbrokers object on the score of expense, and because people would object to the possible smell of the disinfectant. To this the reply is very simple. As to the expense, the pawnbrokers might be empowered to charge an extra sum on such articles as require disinfection to render them innocuous; whilst the objection of the pawner is one that cannot be allowed for a moment when the general public safety demands the adoption of precautionary measures. Means might also be devised whereby each article could be effectually isolated from the rest. Many solutions of the difficulty at a slight expense and trouble will offer themselves for consideration, but it is clear that some means should be speedily adopted. Inquiries made at the 'Mont de Piété,' in Paris, and the 'Versatzamt,' in Berlin, show that the danger is somewhat reduced by the pawners being obliged to give their real names and addresses; but the inquiry having called attention to the subject, it is acknowledged that it is not sufficiently controlled.

THE EXETER WATER-SUPPLY.

BY G. W. WIGNER, F.C.S.

I THINK the following paragraph in the *Standard* of October 22 last will be sufficient to prove the necessity of an independent report on the water-supply of this town:

THE WATER-SUPPLY OF EXETER.—Very considerable agitation has been going on in Exeter for over twelve months in consequence of the present intermittent supply of water to the city. The supply is taken by the company from the Exe, and as the sewerage of Tiverton and other towns flows into it the water does not improve by being kept in cisterns. Fish have sometimes made their way into the pipes, and recent instances are given of dead mice being found in the cisterns, whilst a clergyman who was among the speakers at a large public meeting, held on Saturday night, mentioned that an old mouse made its nest in the top of the cistern. It there gave birth to five young ones, and the discovery was only made when the water became so bad as to make the persons drinking it ill, and then the cause was found in the decomposed bodies of the five young mice, who had fallen into the water and had been drowned.

When the water-supply of a place becomes in such a condition as this appears to be it is high time that the question of a satisfactory water-supply was taken up by those immediately interested, and I am glad to see that the inhabitants are bestirring themselves in the matter. As my assistant, when collecting samples from the watering-places in the west of England, obtained some from Exeter, and I have also been favoured with samples by other gentlemen, I have thought it desirable that I should analyse and report upon the water at once.

The town clerk informs me that the supply is furnished by a public company who obtain the water from rivers, that the supply is not constant, but is available for fires. I have not been able to obtain any information as to whether the water is filtered before it is supplied. I have received three samples of this supply, and although they agree to some extent in general characteristics, yet there are some points of very material difference between them.

The sample marked No. 1 was drawn from the mains by my assistant on Oct. 3. That marked No. 2 was received by me from the town clerk on Oct. 20. The results were as follows:

	No. 1. Grains per gallon.	No. 2. Grains per gallon.
Total solid matter	9·10	7·90
Loss on ignition after deducting combined carbonic acid	4·70	2·30
Lead and copper—none.		
Iron—slight trace.		
Chlorine calculated as chloride of sodium	1·46	1·76
Hardness before boiling, No. 1, 3·7°; No. 2, 3·0° (Clark's scale)		
Hardness after boiling, No. 1, 3·7°; No. 2, 2·8° (Clark's scale)		
Nitrogen as ammonia	0·0027	0·0020
,, albuminoid ammonia	0·0033	0·0077
,, nitrates	0·0700	0·0280
,, nitrites	traces	traces
Total nitrogen in these four forms	0·0760	0·0377
Oxygen absorbed by organic matter	0·0280	0·0540

Both samples had a pale yellow green colour, and No. 2 had a decidedly offensive taste. The results of the microscopical examination of both samples were extremely unsatisfactory; they both contained considerable quantities of decomposing animal matter, and crystalline forms, which certainly were not of such a character as should be found in water containing such a small amount of total solids as these two samples do. It is also especially to be noted that although there was an interval of little more than a fortnight between the dates when these samples were drawn, they differ very materially in some points of the analysis. Thus, the albuminoid ammonia in the sample received on Oct. 20, is more than twice as heavy as in that drawn on the 3rd, and the loss on ignition has decreased one half. The good features of the water are its softness, and comparatively low proportion of total solids, but it is impossible to rank it higher than as a second-class water.

I received another sample from an independent gentleman in the town; it was said to have been drawn from the mains on Oct. 15, that is, between the dates when the above two samples were obtained. The results of the analysis of this sample did not differ very greatly from the mean of the two previous ones, but singularly enough the sample shows a slight increase in the yellow tint which was noticed in the others, and a corresponding increase in the oxygen absorbed by organic matter. The micro-

scopical results were, however, somewhat more satisfactory.

I have been informed that two other sources of supply are used to some extent, although I am not in a position to say that they are really used for domestic purposes. Both of these are said to be derived from sandstone wells or springs, but the figures of the analyses do not bear out this statement, they rather indicate that the waters have been drawn from different strata. One of the waters is said to supply a drinking fountain in the town, and the other to be used mainly for manufacturing purposes. The results of the analyses are as follows :

	A. Grains per gallon.	B. Grains per gallon.
Total solid matter	54·40	47·00
Loss on ignition after deducting combined carbonic acid . . .	17·15	13·12
Lead and copper—none.		
Iron—trace.		
Chlorine calculated as chloride of sodium	7·02	7·02
Hardness before boiling, A. 16·0°; B. 15·4° (Clark's scale)		
Hardness after boiling, A. 15·2°; B. 13·4° (Clark's scale)		
Nitrogen as ammonia . . .	0·0026	0·0025
,, albuminoid ammonia .	0·0030	0·0031
,, nitrates	1·0500	1·2400
,, nitrites	traces	traces
Total nitrogen in these four forms .	1·0556	1·2456
Oxygen absorbed by organic matter .	0·0256	0·0256

Both samples agreed in having a fair blue colour, but an objectionable smell and taste; they also agreed in showing an excessive amount of loss on ignition—so excessive indeed that it was quite impossible, viewing the figures of the analyses, to attribute it entirely to the presence of organic matter strictly so called. The nitrates are heavy in both samples, and the microscopical examination showed that they contained a large number of living animalculæ and fibres of cotton and other similar vegetable matter. In my opinion, these two samples are the same water pumped at different places; as regards their specific character they stand almost alone among the hundreds I have analysed recently. The average chemical results would only carry the waters into the second-class, but decomposing animal matter, which can be seen by the microscope, is certainly not a proper thing in the water-supply of such a town as Exeter.

Under these circumstances, therefore, it is very satisfactory to find that at a meeting of the inhabitants on October 20, it was decided to form a new company,* who will procure their water from Dartmoor, which may reasonably be expected to be better than the river Exe. Still more, I hope that the new supply will be constant, for I believe a large proportion of the waters which are condemned are contaminated by infiltration due to an intermittent supply.

THERE were ninety-five applicants for the appointment of surveyor, inspector of nuisances, and collector to the Huton with Roby Local Board and Urban Sanitary Authority, Lancashire, at 150*l.* per annum with a house.

* The Company, which I believe has been registered, proposes to erect works to supply Exeter and the adjacent towns with water from Dartmoor, or from some other source uncontaminated by sewage or other matter, and so that such supply shall be continuous, and of a high pressure.

THE
SANITARY RECORD.
FRIDAY, NOVEMBER 16, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

THE PREVENTION OF COLLIERY ACCIDENTS.

THE frequent occurrence of explosions of fire-damp in coal mines during the autumn and winter months of the year has been over and over again remarked, and commented upon in these columns. The principal causes, too, of such disasters have been repeatedly indicated, and at the same time means for their diminution, if not of their absolute prevention, have also been clearly explained. Still, however, there remains apparently much to be done in the same direction, and the recent appalling calamity at the Great Blantyre pits throws a ghastly light upon the imperfect systems of coal getting at present in practice.

In view of the Governmental inquiry now opened up in reference to this last holocaust, it would neither be justifiable nor prudent for us to advance any theory explanatory of the way in which the sad event was 'trammelled up.' The general question of the prevention of colliery accidents, nevertheless, is fairly within our province, and the more especially so since the present is the season for such calamities, as is demonstrated by the bitter experiences of the past. Beyond doubt variations in the height of the atmospheric column are accountable to a considerable extent for the imprisonment, or the release of the deadly gas, the subsequent violent combustion of which has cost us during the last fifteen or twenty years, on an average, one human life every day! It is perfectly obvious that any diminution of the pressure of the atmosphere on the face of the coal in a pit, must facilitate the liberation of the pent up gas impregnating that coal, or filling its interstices. On the other hand, an increased pressure of air as plainly tends to keep the spirit of death, 'cabined, cribbed, confined' within the precincts of its birthplace, and therefore out of the exercise of any power for mischief.

The lesson to be gathered from a knowledge of these primary and simple facts does not, as yet, appear to have been learned by those most deeply concerned in attaining and acting upon it. At any rate official statistics abundantly prove that explosions of fire-damp are far more numerous when rapid barometrical changes occur, and indicate

fluctuations in atmospheric pressure—namely, during the winter months. Such changes should, in reality, act as monitors to those in charge of a coal-pit, to as great an extent as they have become so to those who note, and then indicate them to the fishermen and sailors along our coasts. The practice of working mines by 'double-shafts,' or, in other words, of 'getting' coal both by day and by night, and thus freeing immense volumes of gas, which cannot be swept out of the workings, but which intermingle with the air and thus make up an explosive compound, cannot be too strongly deprecated. It has been the direct cause indeed of many so-called 'accidents,' and at all events from November to March in each year, double shift working should be constituted an illegal and punishable act.

In respect of the ventilation of mines, of which we have previously spoken, it is undoubtedly one of the most momentous of all the points to be observed in the raising of coal. It is high time, as Edward J. B. Shakspear seems to intimate in a letter which appeared very recently in the *Times*, and wherein he displays considerable knowledge of his subject—it is high time that the system of endeavouring to secure ventilation by means of furnaces should be abolished at once and for ever. We say 'endeavouring,' because it is next to impossible to effect the object completely by such means, and because furnaces, within a 'fiery' pit especially, cannot fail to be a dangerous accompaniment to the miner's work.* The 'fan' which is now happily being employed in many of the coal mines of this and other countries, is really a safe and economical substitute for the furnace. As there is no fire connected with it, and it is purely mechanical in its action, it cannot be an agent for effecting the ignition of gas, as the furnace has proved to be on many occasions, and notably was at the Lundhill Colliery some years since. The fan-shaft, too, possesses this signal advantage over the furnace shaft—it may be used in case of absolute need to extricate the workers from imminent peril. This important use of the fan shaft ought certainly not to be overlooked in considering the relative merits of furnace and fan ventilation. The arrangement of the fan-ventilating and life-saving appliance, in order to effect its double purpose, should be placed on one side of the shaft and have an air draught leading to it, whilst the shaft itself should be furnished with a movable cover properly secured, and with apparatus, or steps for the ascent of the endangered men.

As has been said, by whatsoever means effected, proper ventilation is one of the great *desiderata* for the welfare of toilers in the world underground. With it one-half of the poor miner's dangers would disappear; without it he can never be safe. The percentage of casualties in time past to be, directly or indirectly, credited to defective ventilation is very large indeed, and it is to be hoped for the sake of mechanical science and mechanical men that the period is not distant when the stigma thus attaching itself to both will be removed.

Were this problem satisfactorily solved there would be no necessity whatever for employing those delusive accessories to mining, known as safety lamps. Except, indeed, for an emergency, no 'Davy,' 'Clanny,' 'Geordie,' or other portable lamp of any kind should be used in the pit, nor should either be employed at all by any other individual than a viewer, or an experienced overman. The best constructed safety lamp is not safe, if swung about or passed too hastily through an explosive atmosphere. With good ventilation, fixed lamps, lighted by means of gas, and made of good strong glass, of an oblong or prolate-spheroidal form, with a top and bottom of fine wire gauze, would answer all practical purposes. These lamps should however never be placed at a less distance than ten or twelve feet from the 'face,' so that in case of any sudden outburst of fire damp the latter would have time to ascend to the roof and be swept away. There are many other items, of consequence in the aggregate, to the safe working of collieries, but which at this moment it is not desirable to dwell upon. The whole subject is destined to engage hereafter very much more of the attention of scientific men and the public generally than has hitherto fallen to its share, and we reserve for other opportunities any further contributions of our own to the general stock of information which will eventually be accumulated.

* Without wishing to do more than state a fact, it may be mentioned that the furnace system of ventilation prevailed at the Great Blantyre pits.

THE WATERING OF GIN AND OTHER SPIRITS.

THE publicans are fighting hard against the application of the Sale of Food and Drugs Act to the dilution of gin and other spirits with water. The recent successful prosecutions in different parts of the country for watering gin appear to have spread general alarm among the spirit trade, and to have brought the Licensed Victuallers' Protection Societies to the front. The London Victuallers' Protection Society made a strong fight in the recent watering of gin case that came before the magistrate at Bow Street, and the decision there being adverse to them, an appeal was made to the Quarter Sessions. Here the whole question was ably argued at great length. The case was an unfavourable one for the trade, and the defence had evidently to struggle with a palpable sale of an article to the prejudice of the purchaser. It was shown that although the gin was upwards of 42 degrees under proof, the same price was charged for it as was paid for several samples that were purchased in the same neighbourhood, and that were of a much higher strength. This circumstance afforded at once *primâ facie* evidence that the gin had been sold to the prejudice of the purchaser,

and that an offence had been committed against the Act.

It must be admitted, however, that the facts brought out in the course of the arguments in the case revealed an unsatisfactory state of things, and demonstrated that there was a very good show of reason for the position taken up by the publicans. It appears that a rectifier can sell and send out gin or other spirits at any strength he thinks proper, accompanied by a legal certificate, and it is highly probable that if the gin in the present case had been supplied by the rectifier of the strength at which it was sold to the inspector, there would have been considerable difficulty in obtaining a conviction.

In fact as matters now stand, the rectifiers seem to have the power of fixing the degrees of strength at which the retail trade may sell gin and other spirits without incurring any liability under the Act. There is nothing to prevent them from supplying the publicans with gin at a strength of 40 or 50 per cent. under proof, and the analyst admitted that he would call such an article gin if supplied by a rectifier; and this being so, we do not see how he could logically certify the same article to be gin and water in the hands of the publican.

An attempt was made towards the end of last session of Parliament to settle the question by a bill which provided that, in determining whether spirits were sold to the prejudice of the purchaser or not, regard should be had, not only to the strength of such spirits, but also to the price at which they were sold. The bill was obviously regarded at first as a very harmless measure; for in the course of a few nights it passed through the various stages till it reached the third reading, when the analysts took alarm, and brought Drs. Playfair and Cameron to the front, who declared that the bill was opposed in principle to the act which it was intended to amend, and they successfully resisted its further progress.

It is evident that legislation of this kind would have been very exceptional, and we fail to see how matters would have been improved by it. The principle upon which the new bill was founded was unsound, for it is well known that the 'strength' and 'value' of spirits do not always bear the same relation to each other, and that old matured whisky or brandy is worth 25 or 50 per cent. more than such spirits of equal strength, but in a raw unmatured state. We conceive that a magistrate would find it somewhat difficult to determine whether a sale of spirits has been made to the prejudice of the purchaser if he had to notice only one element of value, while the element of quality, equally important to the consumer, was ignored. If a bill, founded on this principle, had become law, we do not see how the legislature could have resisted the application of a similar principle to various other articles diluted similarly with innocuous substances, such as mustard with meal or flour, arrowroot with tapioca, and butter with fat.

It is clear, however, that the question of the watering of spirits cannot be left in its present unsatisfactory condition, and that some solution of the difficulty must be found next session of Parliament. At present there is no uniform system upon which the prosecutions are instituted. We have noticed that some analysts regard gin, when of less strength than 22 under proof, as adulterated with water; while others appear to draw a much wider line, and to pass as unadulterated gin of 30 or 40 per cent. under proof. We have also noticed that in some instances the local authorities have declined to institute proceedings for the watering of spirits, on the ground that they think the public should take care of themselves in such a matter, and that in their opinion the more dilute the spirit the better it was for those who drunk it.

There is no doubt that the publicans have now been so long in the habit of reducing their spirits with water after their receipt from the dealer or rectifier, that the custom of the trade cannot be easily ignored by the Government, and any attempt to fix a hard and fast line at 17 or 22 per cent. under proof will doubtless be strongly resisted by the spirit trade.

If a line, however, be drawn at a point somewhat in accordance with the present practice of the trade, a low standard of strength will require to be adopted, and if so, the change would militate in the end rather against than promote the interests of the public. At present it is possible to obtain gin of a strength of 17 or 22 per cent. under proof, but if a low standard of strength were fixed, the trade would work to it, and the public would be unable to obtain spirits other than of standard strength, and in the result they would be in a worse position than they are now. The question is one that requires to be carefully looked at from various points of view, and it is to be hoped the president of the Local Government Board will not come to a hasty conclusion on the subject, but endeavour to find a solution of the difficulty that will fairly meet the requirements of the trade, and at the same time protect the interests of the public.

Notes of the Week.

THE Town Council of Bolton have raised the salary of Mr. Jonas Proctor, borough surveyor, from 300*l.* to 400*l.*

THE Great Crosby Local Board and Urban Sanitary Authority, Lancashire, have increased the salary of Mr. G. Barton, the collector, from 90*l.* to 120*l.* per annum.

BY an order of the Local Government Board, dated November 1, January 15 is appointed the day on or before which any objections to applications for Provisional Orders under the Gas and Water Facilities Act, 1870, must be lodged at the office of the Local Government Board. An order of October 26 gives the regulations and rules to be observed by applicants for Provisional Orders.

AT Burton-on-Trent a very influential meeting has been held in St. George's Hall, Mr. Samuel C. Allsopp, M.P., in the chair, at which resolutions were passed in favour of applying for a charter of incorporation.

A DEPUTATION from the Winslow parochial committee, last week, attended Mr. George Sclater-Booth, M.P., president of the Local Government Board, upon the proposed creation of a local government district, and from what passed, it is believed that the desired order will shortly be issued.

AFTER a careful investigation of the various known systems of ventilation, Mr. G. Eastlake Thomas, the borough engineer and surveyor, has recommended the system introduced by the Sanitary Engineering and Ventilation Company for the ventilation of the Wolverhampton Town Hall.

AT the township of Crook and Billy-row, in the county of Durham, upon a requisition signed by twenty owners and ratepayers, a meeting has been convened for Wednesday, the 14th instant, at the Mechanics' Hall, Crook, to take into consideration the expediency of constituting it a local government district.

THE following have been elected members of the first local board for Kenilworth, Warwickshire, namely, Mr. Joseph Holland Burbery (chairman), the Rev. Somerset Edward Pennefather, Captain William Alexander Pennington, and Messrs. William Savage Poole, Alexander Carter, Charles Draper, Richard Robbins, 'Luke Heynes, Henry Street, Richard Samuel Hodges, William Mander, and Samuel Forrest.

MESSRS. WATERLOW AND SONS, Limited, of London Wall, will publish, in the course of next month, the 'Municipal Corporations Companion, Diary, Directory, and Year Book of Statistics for 1878.' It will be the first appearance of the work as an annual. A most valuable treatise on 'Municipal Laws,' and judicial decisions thereon, is contributed by W. H. Holdsworth, Esq., barrister-at-law, of Gray's Inn.

AT meetings of both the Wandsworth District Board of Works and the Fulham District Board of Works, resolutions have been unanimously passed protesting against the recommendation of the Select Committee of the House of Commons to transfer the control of the Metropolitan Fire Brigade from the Metropolitan Board of Works to the police. Resolutions to the same effect have been previously passed by the Strand District Board of Works and the Newington Vestry.

PUBLIC LOANS.

THE Local Government Board have issued a circular drawing the attention of the local sanitary authorities throughout the kingdom to the 13th section of the Public Works Loans Act, 1875 (38 and 39 Vict., cap. 89), which requires that all local authorities intending to borrow from the Public Works Loan Commissioners should send to the commissioners, on or before Dec. 31 next, a statement of the new loans or instalments of loans already granted, which the authorities may probably apply to borrow during the ensuing financial year, viz., that commencing on April 1, 1878. The board say that they 'are desirous of reminding the sanitary authority of the obligation imposed upon them by the statute to give notice of their application within the prescribed period, should they contemplate borrowing from the commissioners within the year in question. Unless this condition is satisfied, the commissioners are not empowered, except with the permission of the Lords Commissioners of Her Majesty's Treasury, to make an advance under the Act; and the board think it right to state that they believe that in future their lordships will consider it their duty not to dispense with a strict compliance with the requirement above referred to.'

'NOT A VERY CLEAN WELL.'

A POLICE case published in our Law Reports this week, p. 318, may perhaps tend to elucidate some of the causes of typhoid fever from the milk-supply. The culprit in this case was returning from a certain farm with twenty gallons of milk, which he had purchased to sell again to his customers. The witness, a superintendent of police, saw the defendant fill a can holding three gallons with water, and add it to the milk, and stated, in the course of his evidence, the ominous fact that 'the well is not a very clean one.' How many mysterious outbreaks of disease might be traced to the admixture of milk with water from 'not very clean' wells and ponds?

MORTALITY ON RELIEF WORKS.

GREAT mortality has occurred at the Buckingham Canal, in Madras, a work intended for the relief of famine sufferers. Out of twelve non-commissioned officers of the Royal Engineers appointed to that work, three have died, and four are on sick leave. It need scarcely be said that 25 per cent. is a death-rate which the famine itself in its wildest moments has never reached. The Government has called for a report, which states that 'this alarming sickness and mortality are attributed to want of acclimatisation, physical unfitness, overwork, exposure to the sun, insufficient shelter, and want of food and provisions suitable for Europeans.' So says Mr. O'Shaughnessy, in charge of the work. Information which has reached the *Builder* gives overwork and insufficient food as the chief causes.

CONTRASTED DEATH-RATES.

THE Medical Officer of Health of Glasgow classifies the death-rate of the city in a manner which is very instructive. Thus he divides the localities into five districts, according to the wealth of the neighbourhood and the sanitary condition of the district. Taking the two extreme groups, one has a death-rate of 20 and a birth-rate of 35. Group four has a death-rate of 35, and a birth-rate of 42. Of the children born in the former, 6 per cent. were illegitimate; in the latter, 13 per cent. were illegitimate. In the former the death-rate of children between the first and fifth years was 44 per 1,000, in the latter it was no less than 80. Of the deaths within the first year of life in the first group 84 per cent. were duly certified, but in the fourth only 49 per cent. Thus at the latter there was no proof of medical attendance having been obtained for 51 per cent. of the children who died within the first year of life.

DUST-TUBS AND ASHPITS.

THE President of the Glasgow Landlords' Association has been reckoning up the various experiments made in that city with regard to ashpit accommodation, and he laments the great expense which has been incurred by the owners of property for want of properly-settled plans at first. First, he says, brick ashpits were recommended, then stone; these gave place to Macfarlane's iron patent, which was supplanted by Smith's iron patent, and it again by brick and lime, which was now in use. At one time the roofs were taken off, at other times they were ordered to be put on; to day one mode of ventilation was in favour, to-morrow it was overthrown for some other plan. There was no fixity, no effort at a settled principle. Each new official had his own particular method, and each committee had their own favourite system for collecting household refuse. Mr. Carrick's suggestions gave place to Mr. Macleod's, Mr. Macleod's to those of the first inspector of cleansing, and the latter to his successor's. All the expense of these experiments was thrown on the shoulders of the proprietors. The authorities would take no responsibility in the matter. As to the change now proposed from ashpits to dust-tubs, the chairman said he did not believe that any benefit would be conferred sanitarily by its adoption on the community. He recommended resistance to the Cleansing Committee and to their dust-tubs.

Law Reports.

THE SOUTH EASTERN RAILWAY COMPANY.

PROCEEDINGS having been instituted by the local sanitary authority against the South Eastern Railway, the magistrates at Canterbury have made an order upon the company to abate a nuisance at their harbour at Whitstable. It was alleged that the harbour was used by about 200 ships, that the whole of the sewage from them went into the harbour, and that no means were taken by the company to cleanse the harbour. There was an outbreak of typhoid fever in August, said to be attributable to the nuisance. The sewage from the town also runs into the harbour, and the company defended the action on the ground that the Commissioners of Sewers who superintended the drainage were the parties liable.

WARWICK WATER-SUPPLY.

THE long pending dispute between the Town Council of Warwick and Mr. Hart, the contractor for part of the new water-supply, has been arranged. An action brought by the contractor for damages for breach of contract, was at the last moment withdrawn by mutual consent, and an arrangement made for leaving the whole dispute to arbitration. The contractor's claim amounted to 1,421*l.*, and a counter claim was made by the Council of 4,009*l.* In August Mr. G. Berkeley, C.E., the arbitrator appointed by the President of the Institution of Civil Engineers, held an inquiry at Warwick, lasting five days, the legal points of the case being subsequently argued before him in London. The arbitrator's award directs the Town Council to pay to the contractor 560*l.* 10*s.*, and that there are no grounds for any counter claim. The legal expenses fall on the Town Council.

NUISANCE FROM PIGS.

A MAN named Boreham, of 3 Victoria Street, Shadwell, was summoned at the instance of the Limehouse Board of Works, for keeping pigs in such a condition as to be a nuisance and injurious to health. An inspector of nuisances stated that on the 12th he visited the defendant's premises, and saw a sow and a litter of five or six young pigs. He had been there or three previous occasions, and had seen pigs. The defendant said he was a dealer, and bred them to take on board ship. Jane Preston, the mistress of a board school adjoining the premises, said a very offensive smell arose from the pigs. Dr. Rogers, medical officer of health, said that on October 4 he visited the premises and found sixteen pigs. It was not a fit and proper place to keep pigs, and was a nuisance, and injurious to health. Mr. Chance made an order for the abatement of the nuisance forthwith, and to prohibit pigs from being kept there.

LIGHT AND AIR.

IN the case of *Spottiswoode* v. *Godbold*, in the Chancery Division, before Mr. Justice Fry, Mr. Bund, on behalf of the plaintiffs, moved *ex parte* for an interim injunction to restrain the defendant from carrying up some new buildings so as to obstruct the light and air enjoyed by the plaintiffs. Plaintiffs are the Queen's printers, who have a branch office on the west side of Chancery Lane. On the east side are being erected extensive buildings, in place of small houses and shops, pulled down. These old buildings, it was said, were 43 ft. high, and the plaintiff had discovered that the new buildings were to be of the height of 63 ft. The additional height would interfere with their light and air, especially on the first floor, which was used by *employés* engaged in drawing plans for lithography. The width of the lane was 37 ft. On the plaintiffs giving the usual undertaking as to damages, his lordship granted an interim injunction restraining the defendant from erecting buildings so as materially to interfere with the plaintiffs' light and air.

A FEROCIOUS DOG.

J. JENKINS, oilman, of Fleet Road, was charged for having, on Oct. 11, suffered to be at large in Circus Road, Gospel Oak Fields, a large unmuzzled ferocious dog. On the day in question, J. C. Kelly, a boy, was returning home from school, when the defendant's large water dog, which was in the middle of the road, rushed at him and bit him on the hip. He was medically attended, but was so much hurt that he was obliged to be kept from school for a fortnight, and for some time could not even sit down to his meals. The dog, it was said, had likewise bitten other people. The defendant had expressed his regret for the attack on the boy, though he denied the other, and had offered to pay the medical expenses; but the parents both declared they did not want compensation. They desired to have the dog killed, for the preservation of their child's life and for the protection of the public. Mr. Bridger, the clerk, pointed out a clause in the Traffic Regulation Act giving magistrates power to order the destruction of a ferocious dog. The bench fined the defendant 20*s.*, including costs, and 20*s.* for the parent's expenses, and ordered the dog to be destroyed.

COLLIERY HOUSES.

AT the South Shields Police Court, the owners of Harton and Hilda collieries were summoned for having houses which were unfit for human habitation. Mr. Moore said the question with regard to these houses, of which there were 174, had been before the municipal authorities for at least two years, and there had been more than one or two votes passed confirming the opinion that they were a nuisance, and the only question was whether they should be closed. Of course the difficulty was in providing other accommodation for so large a number of people, but the council thought the time had arrived when they should deal with this great company as with any other owners. He had to ask, therefore that an order be made to close them in a month. The defendants might make application to the council from time to time, and they would not enforce the order until the proper time arrived. Mr. Mabane said the only objection he had to such an arrangement was that a month was rather short. The company had passed plans for new cottages in another part of the town, and they had actually commenced erecting them. The stipendiary made an order for the removal of the nuisance within a month, on the understanding that it would not be enforced if application for an extension of time were made to the council at stated periods until the completion of the new premises.

ARBITRATION UNDER THE PUBLIC HEALTH ACT.

THE Court of Common Pleas has had before it the case of *Burgess* v. *Northwich Local Board*, which raised a question of some importance. At Northwich, the centre of the Cheshire salt district, considerable subsidence of the High Street and the houses situated there had occurred. Accordingly, in 1876, the Local Board raised the road 4½ ft. It was alleged by the plaintiff that his property, which adjoined the street in question, was damaged by this, and he made a claim against the Board in respect of this alleged damage. The Board denied their liability, and the plaintiff then took advantage of the provisions of the Public Health Act, 1875, and referred the matter to arbitration. The Board refused to go before the arbitrator, who, however, made an award in favour of the plaintiff. Mr. Brown now moved to set aside this award, on the ground that the arbitrator had no jurisdiction. He contended that the Act of Parliament only gave power to the arbitrator where the liability was admitted, and where the amount of damages was the question in dispute; but that where the liability for damage at all was disputed, the plaintiff could not avail himself of the arbitration clauses of the Act. The learned counsel relied on the decisions in

R. v. *Metropolitan Sewers*, and *Bradley* v. *Southampton*. Lord Coleridge, in delivering judgment against the Local Board, while desiring to limit his decision to this particular case, observed that there was no grounds for the motion. It could not be that any person by simply saying that he was not liable could put himself outside the provisions of the Act, without giving any reason in support of such a proposition. If the Local Government Board were dissatisfied with the award, they could raise the question of their liability when an action on the award was brought against them.

ADULTERATION OF GIN.

THE Middlesex magistrates sat to proceed with the hearing of the appeal of William Birrell, of the Two Brewers, High Holborn, against a conviction of Mr. James Vaughan, the magistrate sitting at Bow Street Police Court, for selling gin not of the nature and quality demanded, and for which the appellant was fined 5*l.* and costs. The Assistant-Judge, in giving judgment, said: We think this conviction should be confirmed. With regard to the questions raised by Mr. Besley as to the construction of the sixth section of the Act, we have before us the accordant decisions of the Supreme Court upholding the convictions in two cases in which the facts were substantially the same as in the present case. It appears that it is the practice of rectifiers to add water to the rectified spirit or compound after its manufacture, so as to reduce its alcoholic strength to the degree below proof desired by the purchaser, and thus there is no precise limit to the dilution it may undergo before it leaves the distillery, although practically 35 per cent. below proof is the lowest strength for which there is any demand; but then there is no room for fraud or deception in this practice or mode of dealing, inasmuch as the manufacturer is bound to specify, in the permit which the excise law requires him to give to the purchaser at the time of the sale, the actual strength of the spirit or compound sold, and, of course, the price charged varies according to the strength. There is no such obligation, however, upon the seller of a less quantity than two gallons, and if, in order to increase the quantity, he adds water, and reduces his gin below the strength at which the commercial article so called is ordinarily sold, and which it may be reasonably expected to possess, he must be careful not to sell the diluted compound for such article to the prejudice of the buyer, as by so doing he may incur the penalty imposed by this enactment. The evidence has satisfied us that the appellant was rightly convicted. There will, therefore, be judgment for the respondent with costs.

IMPURE GAS: HEAVY FINE OF 400*l.*

THE Commercial Gas Company appeared to an adjourned summons requiring them to show cause why a warrant should not issue to recover eight penalties of 50*l.* each, for having on eight days supplied gas of less purity than was allowed by the Act. Mr. Besley said the defendant company had in September last supplied gas of less purity than allowed by the Act of Parliament. The quality of the gas supplied was determined by gas referees, who from time to time fixed the maximum of impurity at which gas was to be supplied, gas being always more or less impure. In this case the impurity complained of was an excess of ammonia over that which the referees had fixed as the maximum. The fact was known to the defendant company from the report of the examiners. They had not appealed to the chief gas examiner, and the penalties were therefore recoverable against them by distress; the Act gave the magistrate no power to mitigate the penalties, and the question had arisen whether the issuing of the warrant of distress was not really an *ex parte* proceeding on which the company were not entitled to be heard. Mr. Adenbrook proved testing the gas supplied through the testing-house from the works of the defendant company, and produced his certificates. Mr. Read cross-examined the witness Adenbrook, who said that the testings extended over twenty hours, as required by the Act. He had supplied a copy of the certificates to the secretary of the company, and, by courtesy, one to the engineer. In the latter he had marked the excess of ammonia by underlining the figures, and considered that sufficient notice. For the defence, Mr. Read said that he should have to take an objection to the jurisdiction of the Court, the company's works being out of the jurisdiction. Mr. Hannay overruled the objection, Mr. Besley pointing out that the testing station where the offence was shown was within the district. Mr. Read took a further objection that the notice given to the company was insufficient under the Act; but this was overruled. Mr. Read then said that he had to submit that the magistrate had power to limit the penalty, and apply it to only one day. Mr. Hannay said that the Act fixed the penalty, and he could not alter it. Mr. Read said that he would then ask that a special case should be granted on the question of jurisdiction and on the 42nd section of the Act, or permit them to appeal. Mr. Hannay said that he could not grant a case on such grounds, and under the 20th and 21st Victoria there was no appeal. He felt, really, that there was considerable doubt whether the company had a right to be heard in the matter, and whether the warrant ought not to have been issued on the *ex parte* application. The company, under the 49th clause of the Act, had a right of appeal. They had not availed themselves of that right, and there was no answer now. Mr. Read said it was the first proceeding of the kind against a gas company, and it was a most important public matter. Mr. Hannay said that upon the facts proved he could only order the warrant to issue for penalties claimed, 400*l.*

A MILK ADULTERATOR CAUGHT 'IN FLAGRANTE DELICTO.'

AT the Barrow Magistrates' Court James Hexton was charged, at the instance of Supt. Barker, with selling adulterated milk. Mr. Nalder appeared on behalf of the defendant. Mr. Barker stated that the defendant was a milk dealer, and on the 3rd inst. he purchased a pint of new milk from him, for which he paid 2*d.* Previous to this he had received information that the defendant was in the habit of watering the milk he sold. Mr. Nalder objected to any statement of that character. They were charged with selling milk not of 'the substance and quality demanded,' and Mr. Barker could only give evidence on that point. Mr. Fell thought Mr. Barker could not go further than to say he had reasons to suspect the milk was watered. Supt. Barker said he was going to give evidence of that. Mr. Fell was inclined to think the objection of Mr. Nalder was right. Defendant had pleaded guilty to the charge, and the certificate of the analyst as to the condition of the milk was all they had to deal with.—Supt. Barker said, but surely he could give evidence of having seen the defendant water the milk. He could prove, by the evidence of a policeman, that the defendant was seen to put water in the can from which he (Supt. Barker) received the milk he purchased. Mr. Nalder said that did not matter.—Supt. Barker said he could prove that after leaving the premises of the farmer the milk was watered.—Mr. Nalder pointed out that his objection had been urged in other courts and upheld.—The Bench having taken a note of the objection, Supt. Barker proceeded to produce the certificate of the county analyst, who had analysed the sample forwarded to him, which showed it to be adulterated to the extent of 10 per cent. with water.—Mr. Nalder: Have you always found defendant to be a respectable dealer in milk?—Supt. Barker: I have found he is not a respectable dealer in milk.—Mr. Nalder: Then you have not complied with your duty, in not bringing him before the magistrates before.—Mr. Fell: The whole of this conversation is entirely irregular. John Marshall Tyson, farmer, Billincoat, stated that on the 3rd inst. defendant purchased twenty gallons of milk from him. When he received it, it was just as they had got it from the cows. The price

was 11*d.* per gallon in winter, and 10*d.* in summer. P.C. Pincock, stationed at Furness Abbey, said in consequence of information received from Supt. Barker, he watched defendant on the 3rd inst. returning from Billincoat Farm. On the road there is a water trough, and witness saw him fill a can, which would hold three gallons, with water and add it to the milk. During the time this was going on he was lying behind a hedge. Supt. Barker: This well is not a very clean one. Inspector Barlow spoke to serving the summons upon the defendant, and having a conversation with him, in the course of which he admitted having watered the milk; but gave as a reason for doing so that his customers were determined to have the milk, and, in order to keep them, he had watered it to make the quantity larger, as he could not get any more from the farmer. Mr. Nalder pointed out that this was the first offence of this character defendant had been charged with, and asked the bench to impose a mitigated penalty. Supt. Barker asked for the imposition of the full penalty. He could show that the defendant could not have been making less than 2*l.* or 3*l.* a week more than he would ordinarily have done. The bench inflicted a fine of 5*l.* and costs.

A STEAM ROLLER'S LIABILITIES.

AT Westminster, the Misses Clarke, owners of Waldegrave House, Smith Street, Chelsea, were summoned by the Vestry to show cause why they should not be ordered to pay the cost of the repair of their cellar, which had been in a defective state. The evidence on behalf of the Vestry was to the effect that in June last the street had been rolled by a steam roller, weighing fifteen tons. The process over, the roller was taken away at the rate of a mile per hour, at a distance of 16 in. from the kerb. Suddenly the hind wheels disappeared down the vault of the Misses Clarke's honse, and on examination the surveyor of the parish found that the mortar was rotten and soft, and that water had come through the roof. The weight of the steam roller, as distributed, was no greater than that of the ordinary traffic; the street was wide. For the defence it was urged that the steam roller was considerably heavier than ordinary traffic, and that the weight had gradually crushed in the cellar. Mr. Shields, engineer to the Crystal Palace, gave it as his opinion that the weight of the roller was excessive. Miss Clarke also deposed that one of the hind wheels of the roller had jarred against the kerb. The road over the vault gave way under the roller. It was also shown that the vault was properly built, and that the adjacent vault had two large fresh cracks caused by undue pressure near the crown of the arch. On the part of the Vestry, evidence was brought forward to show that weights of from fifteen to forty tons were carried along the thoroughfares, such as stone, girders, boilers, etc. It was admitted that about six tons would be the average weight of ordinary traffic, a coal waggon of four tons of coals being taken as an example. It was shown that coals had been delivered for years at the house in question, and the cellars were sound. Mr. D'Eyncourt said that if the roller were worked on a dead level the amount of pressure to the inch would not perhaps be excessive—he understood about 4cwt. to the inch—but if an irregularity should occur in the surface, the wheels in front might be raised, so that the whole weight might rest on a given point. Now it appeared that the weight of ordinary traffic scarcely exceeded six tons. Taking, for instance, a coal waggon with four tons of coal, and allow two tons for the waggon. The distribution of that weight gave one ton and a half to each wheel. That, therefore, was the extreme weight brought to bear on a given point, apart from the pressure caused by drawing. It appeared that weights varying from 20 to 35 tons were sometimes conveyed through London on wheels with 9-inch tires, generally on six wheels. Such loads could be taken only at considerable risk, and should danger occur to the road or vaults under it, those who ventured on sending such weights would in his opinion be responsible for it. The vault in question, was built well enough to stand the ordinary traffic, and the evidence showed that the adjoining cellars—no doubt built at the same time—were as dry as such cellars usually were and that the mortar was firm. From all the circumstances Mr. D'Eyncourt came to no other conclusion than that the damage was caused by the weight of the roller, and that roller being much heavier than the ordinary traffic it was the duty of those who used the engine to ascertain whether it was safe to use it. He should dismiss the summons and allow 20 guineas costs against the Vestry. Mr. Pemberton said it was a serious matter for the Vestry and asked for a case for a superior court. Mr. D'Eyncourt said he would consider that.

SANITARY PROSECUTIONS AT SOUTH SHIELDS.

JOHN BINKS, house owner, was summoned, at the instance of the sanitary authority, for permitting a nuisance to exist on certain property in Blumer's Terrace, after having received due notice thereof. Mr. J. M. Moore, Town Clerk, appeared in support of the case, and Mr. G. R. Duncan defended. The nuisance complained of arose from the close proximity of an ashpit and privy used by a large number of tenants, to the windows of the dwelling rooms, and, according to the evidence of Dr. Spear, it was a nuisance injurious to health. The stipendiary, after witnesses had been heard for the defendant, said that a nuisance had been proved. No medical evidence had been brought to controvert Dr. Spear's evidence, and an order must be made for its abatement. The town clerk asked that the order should be made in the terms of the notice—that is, requiring the erection of a trough water-closet in lieu of the present privy. Mr. Duncan objected. After considerable discussion, the stipendiary asked Dr. Spear if the nuisance would be abated by the removal daily of the refuse. Dr. Spear replied in the negative, and said that if all the refuse were removed, still there would be a large surface of brickwork, saturated with organic matter, exposed to the atmosphere. For the abatement of the nuisance not only must there be a daily removal, but proper means for such removal must be provided. The stipendiary made an order for the abatement of the nuisance in the manner prescribed by the notice, within one month.

WILLIAM HALL, house owner, South Shields, was summoned at the instance of the Sanitary Authority for having knowingly let for hire a house in Reid Street in which a person had been suffering from scarlet fever. Mr. J. M. Moore, Town Clerk, appeared in support of the case, and Mr. Scott defended. Evidence was called to show that Mrs. Hume, whose child had been suffering from scarlet-fever, had removed from Mr. Hall's house, and that the defendant had let the house to Mrs. Elsie. This latter person discovered that there had been fever in the house, and did not go into it for a week. She disinfected the house, before taking possession. The Stipendiary: But that was not done to the satisfaction of a medical practitioner. Dr. Spear said he had visited Mrs. Hume's child, and found it had all the appearances of having recently suffered from scarlet fever. The house had not been properly disinfected. Mr. Scott, for the defence, said that Mr. Hall was aware that there had been fever in the house, but he was not aware it was scarlet fever. Mrs. Hume was, however, recalled, and she stated that she told Mr. Hall her child had suffered from scarlet-fever. The stipendiary fined the defendant 40*s.* and costs, and said if any further cases of this nature were brought before him he would inflict a severe penalty. Scarlet-fever prevailed to a considerable extent, and house owners had had ample notice given them for taking care against the spread of the disease by acts of this character.

AT the South Shields Police Court, on Nov. 6, James Readford, Newcastle, was summoned by Mr. Hindmarch, sanitary inspector, for having knowingly let his house, 94 Palmerston Street, in which a person or persons had been

suffering from scarlet fever, without having the house disinfected to the satisfaction of a medical practitioner. Mr. J. M. Moore, town clerk, appeared in support of the information, and said it had been deemed necessary to take the present proceedings, owing to the fact that scarlet fever prevailed to a great extent in the town, and it was the desire of the sanitary officials to prevent its spreading. According to the evidence of Mr. Hindmarch, a person of the name of Hunter had occupied the house, No. 94, Palmerston Street, and while there two of the children were attacked by scarlet fever. She stated that she intended removing, but was told that she must not do so, as she would thereby be spreading the disease. Notwithstanding this Mrs. Hunter did remove to No. 98, Palmerston Street, and her house was let to Mrs. Eltringham. Dr. Spear said that at the time Mrs. Hunter left the house, the children were in such a condition as to render the disease most infectious. Mr. Readford said he had no knowledge of the affair until the transaction had been completed. The stipendiary magistrate considered the defendant had committed an offence and imposed the penalty of 40*s.* and costs.—At the same time, Ann Hunter, Palmerston Street, was summoned by Mr. Hindmarch, sanitary inspector, for allowing her son, James Hunter, who was suffering from scarlet fever to be exposed without the adoption of proper precautions against the spreading of the said disorder. Dr. Spear gave evidence as to the child having been in the street while it was suffering from disease. The defendant pleaded guilty, and was fined 20*s.* and costs.

BRIEF NOTES OF CASES.

HIGHWAYS AND TRACTION ENGINES.

1877. *Attorney-General* v. *Mouss.*—Information by county surveyor to restrain builders from taking traction engines over a bridge not capable of bearing great weights. Injunction granted. (*Times*, July 17, 1877.)

LANDS CLAUSES ACT.

1871. *Edwards, ex parte; Marylebone Improvement Act*, 1868, *in re.*—Lands Clauses Act, 1845, § 68. An interest in property created by an agreement entered into by an owner after a notice to treat has been served on him does not confer on his tenant any right to compensation. (40 L.J., Ch., 697; L.R., 12 Eq., 389; 25 L.T., 149.)

LIABILITY FOR ACCIDENTS.

1868. *Hill* v. *New River Company.*—Spouting up of water from a main, whereby plaintiff's horses were frightened and fell into an unfenced excavation in a highway made by a contractor for sewers. Held that the water company and not the contractor was liable. The misuse of the water main was the *causa causans.* (9 B. and S., 303; 18 L.T., 355.)

WATER RIGHTS.

1860. *Briscoe* v. *Drought.*—Definition of 'watercourse.' To constitute a watercourse in which rights may be acquired by user the flow of water must possess that unity of character by which the flow on one person's land can be identified with that on his neighbour's land. Water which squanders itself over an indefinite surface is not a proper subject matter for the acquisition of a right by user. (11 Ir. C.L.R., 250.)

Legal Notes and Queries.

SITE OF HOUSE.

THE 23rd section of the Public Health Act, 1875, empowers the local authority, under certain circumstances, to compel persons whose houses are within 100 feet of any sewer they are entitled to use to make a covered drain emptying into such sewer. In this district there are many houses built, and surrounded with large gardens or pleasure grounds, which are more than 100 feet from the sewer of the urban authority; and the owners of such houses say that they are not obliged to drain into it, notwithstanding that the gardens or pleasure grounds belonging to such houses are within 100 feet of the public sewer. Of course the question involves the definition of the word 'house' in the above Act. Does the word 'house,' or 'site of such house,' in the section in question include the garden, lawn, and such like appurtenances? Your opinion is requested. M.

[There is no legal decision on this question; but having regard to the form of words used in the statute, and to the intention of the enactment, we have no difficulty in coming to the conclusion that the actual surface of ground occupied by the house itself is the 'site' of such house for the purposes of the section mentioned.—ED.]

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

LODGING-HOUSES AND LOCAL BOARDS.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Under this heading I have to point out the evils which are now, as a rule, to be met with in our hotels and lodging-houses, and the steps which in my opinion should be taken to rectify them. I would now say a few words as to the same matters, with regard to our private residences in towns, and with this letter, I will, for the present, take leave of the subject.

The non-ventilation and bad drainage of London houses have of late been matters of notoriety, and not only this, but it might almost be true to add that the higher and more luxurious the rank of life to which persons belong, the more likely they are to suffer from these evils. This perhaps is hardly to be wondered at; the indoor, sedentary life of most people in high society renders them more susceptible to these influences than the bustling, out-of-door existence of the poorer classes. As to children, the remark would be the same; the children of poverty may live in the streets, and may play in the gutters, but by these very means they breathe more out-of-door air than the well looked after children of the higher classes. Again, the dwellings of the poor may be small, and ill-drained; privies may exist at the back of the houses, and smells may reign supreme; but what is the case as to the houses of the rich? The necessities of civilisation suppose that the slops and refuse (emptied by the poor most probably into the street), must be got rid of inside the houses; they are poured away from housemaid's closets and scullery sinks; there must be water-closets on every storey; the closet-pipes are carried down neatly within the house; these pipes, and the drains below are hermetically sealed; if anything 'goes wrong with the closets' the plumber is called in to make it safe. in other words to 'bottle up' any bad air which may be in the pipe, and which may be trying to make its escape. unfortunately pressure from without must and will come on this confined air; not having had means of escape, it has become in time more and more dangerous; some slight flaw occurs in some pipe, and the noxious deadly gas finds somewhere an escape into the house, and illness and disease, if not death, follow in due course.

The great preventive against all this is plainly ventilation; ventilate the soil-pipes, ventilate the drains, and you will prevent the formation of this foul gas; it has been said that ventilating pipes have one evil, namely, that even when the sewer gas escapes from them above the roof, it still retains its poisonous nature; this may, or may not be; for my own part, I would prefer to walk along a street with sewer gas escaping into the air above the roofs of the

houses on each side of me, rather than I should have to live in a house with it 'bottled up,' and seeking to find its way to me; but I maintain that if drains were properly ventilated this sewer gas would not exist in its poisonous state. Supposing, for instance, a long drain carrying sewage, tapped in two places, a down-cast pipe let in at one place, and an up-cast pipe at the other, the free passage of air down one pipe, along the drain, and up the other pipe would prevent the accumulation of foul air, and consequently any houses along this drain could not have sewer gas forced up into them from it.

We are told that the drainage of Marlborough House is in a very bad state; that the whole system of its drains, closets, etc., is to be thoroughly overhauled; that this should be of public benefit, let me hope that more than this will be done; by all means let everything be put into a thoroughly good and healthy state, but let drawings and plans be published, showing what the system is now, and what steps are taken to rectify the evil; let us have the means of benefiting by this example; and from the remedying of a disgraceful state of things in a Royal Palace, we may gain some insight as to how we are to remedy the defects of our own private residences.

I maintain, however, that the redraining and ventilating of a house like Marlborough House at one end of a street, is not sufficient; I presume that a sewer, or drain, runs the length of Pall Mall, into which the sewage from the houses empties itself; take the length from Marlborough House to the Athenæum Club; let us suppose that every house drain on passing below the foot-pavement, was there fitted with a siphon bend; and from the end of this siphon bend furthest from the house, a two inch ventilating pipe was carried horizontally to the foot of the wall, and then up outside it (like a rain pipe) to about three or four feet above the roof; by this means each house would be quite independent of its neighbour, it would have in its own pipe an escape for any foul air, and no sewer-gas could by any means come into it; besides which, the ready escape of foul air up these pipes, would prevent the formation of sewer gas, which must be constantly generated in the drains, under the present 'bottling up' process; the air would be in a constant state of motion, and would thereby be rendered almost, if not quite, harmless.

Here, then, we have a straight street, with notoriously unhealthy houses, such as Marlborough House and the War Office in it. Let the drains from these houses be trapped and ventilated as I proposed; the clubs would probably follow suit. We might then see, and, I believe, with no uncertain result, the consequences of ventilation of a street sewer.

As to the other points, on which I have insisted in my former letters, namely, the pipes from the housemaid's closet and from the scullery sink ending before they reach the drain, I must admit that this may be more difficult to carry out in town houses than it is in country villas and detached houses. Still it would hardly require much engineering talent to prevent the foul air coming up these pipes, and to pass it on to an escape above the roof. Ventilation again comes in to help us. Suppose, anywhere in the length of these pipes, a bend occurs like a small siphon, it is plain this would act as a trap, and the carrying up of the pipe above the roof would allow of the escape of any foul air should any pressure come from the drain below. Suppose, for instance, that the housemaid's closet and scullery were one above the other, and that a ventilating pipe was carried from the drain through to the roof; if the short pipes from the closet and sink joined this ventilating pipe in the form of a letter V, it is plain that here would be a siphon trap, and the pipe would carry off the foul air upwards.

All this seems so simple and so straightforward that it is rather odd that it has never been done before now; the truth is that local boards and sanitary officers, whether in London, in towns, or in country villages, do not look after these things as they ought. No one else is likely to stir in the matter; the builder who builds the houses is not likely to live in any one of them; they are built, and then let or sold; during the building no one is there to insist upon what hereafter turns out to be absolutely necessary for the healthiness of these houses. Time rolls on; little by little small defects are found out; when leaks occur they are immediately stopped, and the 'bottling-up' process is carried on to perfection, and the hermetically-sealed pipes and drains encourage, even if they do not cause, the production of sewer-gas. After some years, a little mortar gives way, the soldering of a careless plumber turns out to have been badly done, and the poison pushes its way into our bed-rooms and drawing-rooms.

It may of course be said that our houses are not so imperfectly built as to allow the gas, even if it did escape, to come into our rooms, etc. As to the perfection of builder's work at present, perhaps the least said the better, more especially in small country towns or in watering-places, which are gradually being made into nests of lodging-houses and hotels; but I will end this letter with an experience of my own. I was once at Aldershot, in permanent barracks, and in good rooms; in my sitting-room (away from any closet and, as I was told, at some distance from any drain) there were two small cupboards let in in recesses against the wall; they were boarded at the back, and there was a small space left at the back between these boards and the wall itself. In consequence of one of the cupboards having been filled too full, and the doors pressed to, and locked, some of the boards had been started back. The same day as this was done I came back from a ride late in the afternoon, and on entering the room I smelt a smell which made me vow vengeance on my dog, who used to share my quarters. After lighting a candle I found to my astonishment that my dog was not in the room! After some time the smell passed off; but it came on again next morning about 10 o'clock, and lasted about a couple of hours. These facts were in due course reported to the engineer department, who at once hazarded the idea of a dead rat under the boards. It was useless to point out that a dead rat would smell equally at most times, and I hinted the possibility of 'drains.' I was silenced by being told that no drain came near the room in any way whatever. A man was sent; he took up the boards, and naturally found no rat. On looking into the cupboard he removed the loose boards at the back, and asked me whether he should put them straight again; he did so, and that evening the smell almost ceased. The next day he, by my advice, laid on two coats of paint on the inside of the cupboard, and the smell stopped altogether. I had 'bottled it up' completely, and I only charitably hoped that it might be carried upwards, and escape to the roof; at any rate I was rid of it.

I merely mention this to show that we can never be certain as to the state of pipes and of drains; I therefore say as a last word, 'Ventilate,' not only in country houses, and in watering-places, but in London, in county towns, and in country villages—you cannot be safe unless you ventilate. Ventilate your sewers, your drains, your closets, and your sculleries; give the outer air an ingress to, and afterwards an egress from, pipes and drains which are now hermetically sealed; let the 'bottling up' process be exploded and cease to exist, and I will answer for it that typhoid fever will cease also; at any rate, the occupiers of well drained and well ventilated houses will have done everything that can be done to make themselves and their children safe from it.

J. R. T.

P.S.—I extract the following from a paragraph headed 'Torquay Local Board' in the *Western Morning News*: 'The medical officer also stated that steps were being taken by the sanitary committee to obtain an improved and systematic ventilation of the main drains, and he hoped that ere long a thorough system of sewer ventilation would be introduced, as the welfare of the town at large greatly depended upon such an arrangement. Mr. Murray pointed out that there were already some seventy or eighty sewer ventilators in the town,' etc. If drains and sewers

can be ventilated at Torquay, it is difficult to see why this cannot be done, not only in London, but in every other town and watering-place in England.

WATER ANALYSIS.

(*To the Editor of the* SANITARY RECORD.)

SIR,—If you can spare me the necessary space I will reply as briefly as possible to Dr. Parsons' letter in your last issue.

1. As to the estimation of nitrates by the indigo process. The principal precautions necessary are to have a good sample of indigo carmine to prepare the solution with—and to maintain the temperature of the sample which is being tested steadily at the proper point during the whole time occupied by the analysis. To make sure of attaining the latter result a spirit lamp should be at hand to heat the flask in which the process is being conducted, and the bulb of a thermometer should be kept continuously in the mixture.

2. There is no process so easy for the estimation of nitrites as the permanganate one. Nitrites in water decompose a dilute solution of permanganate *instantaneously*. Organic matter of the types ordinarily so called decompose it so slowly that some hours are occupied. By a little practice it is easy to discriminate between the instantaneous and the gradual action, and by making the proper allowance for the two or three drops of the extremely dilute permanganate which must be used and which are required to tint, say half a pint of water perfectly free from nitrites to the palest pink tint, it is comparatively easy to estimate the nitrites to the third place of decimals, provided of course that no other disturbing agent is present.

3. The nitrogen found as nitrites must be deducted from the total found by the indigo process.

4. Dr. Parsons is mistaken as to urea. The ordinary process of distilling water with or without carbonate of soda does not decompose urea, neither does the process of boiling with alkaline permanganate. There are cases in which (owing perhaps to the presence of foreign substances) a small quantity of the urea may be decomposed, but I have never obtained so much as one twentieth of the total nitrogen present in the urea in the form of ammonia in the distillate. No doubt this is the weak point of the albuminoid ammonia process, but since the determinations which this process gives are of the utmost importance in the analysis, it does not form any argument for the rejection of the process, but rather for using in addition to it such other determinations as may be necessary.

Dr. Parsons' argument as to the minute amount of urea present in the Cromer water therefore fails entirely. I should be sorry to say how many times his figures need to be multiplied, but I think I may safely grant him his own figure of 250 and probably more.

It is impossible in a letter like this, to describe the mounting and examination of microscopical slides, but in general terms I would say, evaporate a few drops slowly—either at low temperature on a glass slide placed on a piece of millboard on the top of the water oven, or in a dessicator—and examine carefully by oblique illumination-polarisation, and if necessary by treatment with reagents on the slide while under examination. If these processes are carefully done it is possible to detect much less urea than I found in the Cromer water. G. W. WIGNER.

79, Great Tower Street, E.C.

A BATCH OF QUERIES.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Will you kindly answer the following questions in your next?

1. What is the indigo test for nitrates, or where is it to be found?

2. What is Dr. Miller's process with the permanganates?

3. Where can the colorimeter be obtained, and the price?

4. Where are the reports of the medical officer of the Privy Council published?

5. Can a police officer seize meat which he thinks bad, or *must* an inspector of nuisances be the party?

M. O. H.

[1. The indigo test for nitrates is fully described at pages 111 and 320 of Sutton's 'Volumetric Analysis,' new edition. Churchill.

2. Dr. Miller's process with permanganate of potash consists in the addition of a definite quantity, which is allowed to act for three hours, and then titrated back with hyposulphite of soda. See *Journal of Chemical Society*, Series II., Vol. III., page 125.

3. The colorimeter can be obtained of Cetti and Co., Brooke Street, Holborn. The price is 26*s*.

4. At Hansard's, 37, Great Queen Street, Lincoln's Inn Fields.

5. If action is being taken under the Public Health Act, our correspondent will see, by reference to § 116, that a policeman as such is not invested with any powers of seizure on his own account. A policeman would not, however, be exceeding his proper functions if he were to report to either of the officers named instances where he thought that their interference was desirable.—ED.]

MR. G. H. ROBERTS' SEWERAGE 'SYSTEM.'

(*To the Editor of the* SANITARY RECORD.)

SIR,—Your issue of this day's date contains a notice of proposed sewerage works for Skelmersdale, to be carried out according to plans prepared by Mr. G. H. Roberts, C.E., of Preston. Throughout the negotiations attendant upon this matter, Mr. Roberts has, in the most public manner possible, taken credit to himself for being the designer of a certain 'system' upon which his plans were said to be based, and in common, no doubt, with many others, I have been curious to learn something of its peculiarities and capabilities. The first notice of this 'system' which I can call to mind was published in the SANITARY RECORD of June 10, 1876, and contained the following brief description of its principles, as proposed to be applied to the town or village of Barton: 'Instead of one main sewer, Mr. Roberts proposes to divide the town into sections, and convey the sewage to several small tanks placed at some suitable spots in the outskirts of the town.' Great stress was laid upon the assumed advantages of this system, especially as regards prime cost of works, over the ordinary one, whereby the sewage is preferably concentrated to one outfall. No mention, however, was made of the fact that these separate outfalls each involve additional working cost and neutralise to a large extent the economy in manipulation which is afforded by a comprehensive system of sewerage.

Your issue of January 27, 1877, in an article headed 'Sectional Drainage,' again refers to this 'system,' and substantiates the above description of it. We now come to the celebrated Skelmersdale case, with the much vaunted saving involved by an expenditure of 3,189*l*., according to Mr. Roberts' plan, as against 7,542*l*., according to the plans of someone else not named. This looked satisfactory enough, but we are now informed that in the scheme finally sanctioned for the sewerage of Skelmersdale, 'Mr. Roberts had been instructed to use only one outfall.' What, then, becomes of the 'system'?

I think it right to point out these facts to your readers, who may otherwise be inclined to run away with the idea that a revolution in the designing of sewerage works is on the point of accomplishment. Mr. Roberts has, at least, yet to show that his so-called system is capable of bringing about this result. At present we have only the fact that he has succeeded in the case of Skelmersdale in designing a scheme estimated by himself to cost 3,889*l*., while another engineer designed a scheme costing 7,542*l*. So far the result seems to be in favour of Mr. Roberts' scheme, but as the very essence of his system, *i.e.* a multiplication of outfalls is absent therefrom, I trust he does

not intend any longer to hold up the case of Skelmersdale as evidence in its favour. I should add, further, that in addition to there being only one outfall in the scheme as now sanctioned, the system of sewage purification adopted is not that of 'several small tanks placed at some suitable spots,' but the more prosaic one of irrigation. Wherein, then, will the sewerage works of Skelmersdale differ from those of other places when completed?

November 2, 1877. J. S. H.

'HOUSE DRAINAGE IN RELATION TO HEALTH.'

(*To the Editor of the* SANITARY RECORD.)

SIR,—I think more of Dr. Buchanan's article than of the commentary by Mr. J. Wallace Pegg's at p. 290. The idea as suggested by the latter of making my auxiliary air-pipe 'at least equal to, or preferably larger that the soil-pipe,' is, under the circumstances, a mistake, and would do more harm than good. An air-pipe on the top of a soil-pipe has different duties to perform from one at the bottom. Dr. Buchanan's sketch may be 'elegant,' but I think it is open to improvement as a practical plan for the following reasons: The outlet from his suggested drain-trap is shown at about three diameters lower than the inlet; so for a 6-inch trap that would give about 1 ft. 6 in. of a drop at that point of the drain, but how many drains can afford such a sudden deep drop? Supposing a drain already laid with a fall of 1½ inches to the yard, and such a trap had afterwards to be put in, this would cause about 36 feet of drain to be lifted, while a still longer stretch would have to be taken up to allow for a new fall, and after all, the action of the trap as shown in Dr. Buchanan's sketch would not be satisfactory, as the water would glide over the round corner, and down the slope without washing away the floating matter as it ought to do. Now, upon my plan only two yards of the above drain would require to be lifted, which would allow two inches of drop in the trap, and one inch to spare of a fall for the other yard of pipe. As to the effect produced by the two inches of fall, in my case I had better quote the following from Professor James Thomson (Professor of Civil Engineering and Mechanics in the University of Glasgow): 'I approve very much of Mr. Buchan's form of drain trap with its cascade action of the water arriving into its pool from the drains or pipes on the house side of its dipping air barrier, and with its aperture for ventilation of the house drains or pipes.' In this case, therefore, the short drop effects the object desired with a small exertion of power, and also, what is so much looked after, a small outlay of time and money. The trap is also being used for various purposes inside of the house as well as outside. W. P. BUCHAN.

124A, Renfield Street, Glasgow.

Sanitary Invention.

FIELD'S PATENT SELF-ACTING FLUSH TANK.

ANYONE who has the slightest acquaintance with the difficulties connected with domestic drainage is perfectly aware that the greatest embarrassment lies in the proper disposal of slops, strictly so called. The difficulty has been to find a handy and portable tank in which to receive slops as fast as discharged from the sinks, and yet have the inlet trapped in order to prevent the effluvium which arises from these wastes; to find a proper means of ventilating the reservoir, and above all to discover a commercial article where the slops can be automatically emptied, or virtually so. Now, in the tank invented by Mr. Rogers Field all this is duly performed. The sink delivers upon an open grating from which woollen shred or bones can be removed, and under which a trap is fitted; and as a syphon is made to regulate the outlet, it follows that when the syphon is full the least addition of water poured into the tank will cause it to overflow and run into the discharging apparatus. This last-mentioned portion of the combined contrivance consists of a peculiarly shapen trough and it regulates the quantity of liquid which is wanted to set its emptying power fairly in action, by checking the outflow of the waste waters from the mouth of the syphon. This is a manifest improvement upon the original tanks constructed upon this patent. Minor amendments are visible in the water seal round the cover, which is easily removable should the tank require cleaning out at any time, and also in the dishing out of the inlet into the tank through the grating of the cover. Anyone who uses earth closets or ash closets knows full well the annoyance caused by the emptying of slops from a bedroom into such dry closets. These slops saturate the earth, counteract its absorbing power, and otherwise prove a nuisance of the first order. Mr. Field's tank provides a proper receptacle for these most offensive house wastes.

Its usefulness as a sink-slop receptacle is not, however, limited to the butler's pantry or still-room, whence comparatively clean discharges are made, for it performs a most beneficent function in the scullery. Who does not know the persistency with which fat clogs up drain-pipes if not properly arrested in a fat-trap, as it is called? Now this tank acts as a perfect grease-trap, inasmuch as it receives at once—when the molten fat tallow and the hot washing water are in as much of a state of union as they can be—the whole direct into a compact chamber, where the two can be naturally separated. Its intermittency of action here proves a benefit. The fat from the washed-out utensil or dripping-pot is very soon congealed into a cake which consolidates over the water, and in many cases this is sufficiently pure to benefit the lower animals in the shape of aliment. Were this all that the tank effected, it would redound to the credit of the inventor.

But this is not all. Supposing that earth closets are tabooed, and water-closets even with a dearth of flushing water used, the off-flowing wastes of the tank can be junctioned into the soil drain, and so made to scour out the pipes. And as when once full, the tank, as previously remarked, only wants a slight accession of water to set the emptying process in action, very many contrivances can be made so as to make the flushing a persistent and a regular one. The drips from the rain-water shoes, the waste water from the pump-trough, which is daily in use, the purposely contrived droppings from a tap—all these will serve the purpose. And whilst on the head of flushing, we should fail in our self-imposed duty were we to neglect pointing out that the tank is valuable as a mere flushing automaton, and can perform this work whether it be made purposely a sink auxiliary or not. It can, indeed, be made useful in many ways, which it is impossible at a moment's recollection to point out. As a mere external disconnecting trap for lavatory basins, clean-water sinks, and bath deliveries, it is evidently the correct thing, and the benefit is enhanced when it silently and regularly commences to flush out the drains.

We have not yet touched upon the merits of the invention as a readily available means of sub-irrigation, but this is perhaps the greatest of the successes achieved by it. We intend to revert to this in another article, and will merely say at present that if the outlet from the distributing trough at the base of the tank be connected with common red agricultural drain-pipes, with butt joints, and if these have been laid some few inches below the surface of a garden or vegetable plot, the flowing sewage from closets, sinks, or from more alkaloid sources will ooze out at the joints into the soil, feed the roots, not drench the leaves, of the vegetation, and the result, provided there is sufficient humus, will be an abundant crop. The sudden discharge of the tank keeps the sewage in motion, and prevents choking; the principle of 'intermittent downward filtration' is followed out, and the sewage is purified. Thus a small cottage can use up its own sewage as well and as profitably as a manor farm. And if a more solid manure is at times a desideratum,

there is always forming at the bottom of the tank, and easily got at, a sludge competent to perform the very things wanted. We published some very interesting letters on this very subject on September 5 and 12, 1874, which would be sure to interest our newer readers.

Were this useful article necessarily an expensive one it would be a manifest pity, but we are happy to say that it is not only made in iron, suitable for heavy exploitation, but is made in small sizes and in earthenware for more modest work. In this form it is already well known, and even largely adopted, in America, where its successes here since 1868 have followed it. The size which holds twelve gallons, and costs only 25*s.*, is especially contrived for cottage purposes, and the largest size, capable of containing forty gallons, is suited to the wants of a mansion. For the rest, the earthenware pattern has, like its prototype of iron, no valves or working parts, and can be fitted by a labourer to whom the Board School is a Central Africa. The makers are Bailey and Co., Fulham Pottery, London.

BLAKE'S SELF-ACTING HYDRAULIC RAMS.

WE have on several occasions had an opportunity of witnessing the thoroughly efficient manner in which these rams perform their work. When once fixed in position they continue in action day and night without attention. Gun metal is liberally used in the construction of the apparatus, which is remarkably durable, requiring no motive power but the water which works it, and reduces the expense of raising water to the small first cost of the machine. Sixteen sizes are made, varying in power from 100 gallons to 100,000 gallons per day of twenty-four hours. One example, but a fair specimen of the capabilities of these rams, has come under our notice. Two thousand gallons were raised in twenty-four hours to a height of 120 ft. by a ram estimated at a capacity of 500 gallons per diem. Where a sufficient fall of water cannot be obtained, the source of supply may be dammed to store up sufficient for periodical use. A very slight fall is, however, sufficient, and the apparatus can be arranged to work with an impure supply, forcing up the pure water from a well or stream through the delivery pipe. Having carefully examined the mechanical details of the apparatus we willingly add our testimony to its substantial workmanship and capability of performing satisfactorily over a lengthened period the work required of it. The durability and satisfactory action of the machine are no doubt mainly due to the fact that gun metal is largely used in its construction. There are many positions in which such an apparatus must prove of immense value compared with steam engines requiring skilled attention, beside being a constant source of expense for fuel and repairs. These rams entail no cost for attendance, repairs are rarely required, and after the first small outlay no further expense is entailed. We know many instances in which they have superseded force pumps, hydraulic rams of inferior construction, and steam pumps. Mr. Blake of the Oxford Street Works, Accrington, is the maker.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

BARNES, Mr. Thomas, has been appointed Inspector of Nuisances for the Kirkham Urban Sanitary District, Lancashire, vice Elliott, resigned.

BUNTING, Lewis Galand, Esq., has been appointed Treasurer to the Daventry Guardians and Rural Sanitary Authority, vice Whitworth, deceased.

CADLE, Mr. J. C., has been reappointed Medical Officer of Health for the Westbury-on-Severn Urban Sanitary District, for one year.

CORNER, Francis Mead, M.R.C.S. Eng.. L.S.A. Lond., has been appointed Medical Officer of Health for the South Division of the Poplar District, vice Ellison, deceased, at 150*l.* per ann.

COX, Mr. Joseph, has been reappointed Inspector of Nuisances for the Leominster Urban Sanitary District at 35*l.* for one year.

CROMPTON, John Gilbert, Esq., has been appointed Treasurer to the Wirksworth Local Board and Urban Sanitary Authority, Derbyshire.

DONKIN, William Frederick, M.A., F.C.S., has been appointed Public Analyst for the Borough of Abingdon at 21*s.* per analysis for the first hundred, 10*s.* 6*d.* per analysis for the second hundred, and 6*s.* per analysis beyond, and 21*s.* for each analysis of water.

HALL, Egerton Francis, M.D. Univ. St. And., L.R.C.P. Edin., M.R.C.S. Eng., has been appointed Medical Officer of Health for the Huyton-with-Roby Urban Sanitary District, Lancashire, at 20*l.* per ann.

HANCOX, William Mott, M.R.C.S. Eng., L.S.A. Lond., has been reappointed Medical Officer of Health for the Bilston Urban Sanitary District, Staffordshire, at 50*l.* for one year.

HANSON, Mr. J. H., has been appointed Surveyor to the Corporation and Urban Sanitary Authority of Barnsley, Yorkshire, vice Kenworthy, appointed to Hansworth, at 250*l.* per ann., office, etc.

HEWITT, Robert Henry, Esq., has been appointed Treasurer to the Towcester Guardians and Rural Sanitary Authority, vice Whitworth, deceased.

HEYWOOD, Arthur, Esq., has been appointed Treasurer to the Huyton-with-Roby Local Board and Urban Sanitary Authority.

JOWETT, John, Esq., has been appointed Chairman of the Huyton-with-Roby Local Board and Urban Sanitary Authority.

KINGDON, Mr. Joseph Francis, has been appointed Clerk to the Wirksworth Local Board and Urban Sanitary Authority.

LAWTON, Herbert Alfred, L.R.C.P. Lond., M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the Poole Urban Sanitary District at 60*l.* per ann. for three years; and the Poole Port Sanitary District at 5*l.* for one year, vice Ellis, resigned.

LLOYD, H., Esq., has been appointed Treasurer to the Solihull Guardians and Rural Sanitary Authority, vice Edwards, resigned.

SCOTT, Mr. Thomas Keat, has been appointed Surveyor to the Whitby Local Board and Urban Sanitary Authority, Yorkshire, vice Walker, resigned, at 120*l.* per ann.

WALKER, William, M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the Kirkleatham Urban Sanitary District, Yorkshire, at 20*l.* for one year.

WORRALL, Mr. B. H., has been elected a Member of the Morley Local Board and Urban Sanitary Authority, Yorkshire, vice Hirst, resigned.

VACANCIES.

CRANBROOK GUARDIANS AND RURAL SANITARY AUTHORITY, Kent. Clerk.

CUMBERLAND. Public Analyst: 21*s.* per analysis, for the first hundred, 10*s.* 6*d.* per analysis for the second hundred, and 6*s.* per analysis beyond, per ann., 2*l.* 12*s.* 6*d.* for each quarterly report, 21*s.* for compulsory attendance, 3*d.* per mile each way for travelling expenses, and 21*s.* per analysis of water. Application, 20th inst., to T. H. Hodgson, Clerk of the Peace, Carlisle.

GLENDALE GUARDIANS AND RURAL SANITARY AUTHORITY, Northumberland. Clerk.

KENILWORTH LOCAL BOARD AND URBAN SANITARY AUTHORITY, Warwickshire. Clerk. Surveyor. Application to William Savage Poole, Clerk, *pro tem.*

NORTH BIERLEY URBAN SANITARY DISTRICT, Yorkshire. Inspector of Nuisances: 30*l.* for one year. Application to Messrs. Lancaster and Wright, Solicitors and Clerks to the Authority.

SILSDEN URBAN SANITARY DISTRICT, Yorkshire. Medical Officer of Health.

STOCKBRIDGE RURAL SANITARY DISTRICT. Medical Officer of Health. Application (stating the amount of salary required), 20th instant, to G. M. Footner, Clerk to the Authority, Romsey.

WIRKSWORTH LOCAL BOARD AND URBAN SANITARY AUTHORITY, Derbyshire. Surveyor. Inspector of Nuisances. Collector. Application to J. F. Kingdon, Clerk.

SANITARY PATENTS.

3465. Improvements in open fireplaces for heating by radiation, ventilating and regulating the heat in rooms, and in the apparatus and appliances connected therewith. Henry Percy Holt, Royal Insurance Buildings, Leeds.

3501. A new or improved stench-trap for preventing the escape of effluvia from drains, sewers, and other places. Josiah Smith and Eli Baker, Birmingham.

3541. Improvements in the manufacture of filtering medium for the purification of water and other liquids. Edward Johnson, Eliot Cottages, Blackheath, and James Roby, South Crescent, Greenwich, Kent.

NOTICE.

THE SANITARY RECORD *is published every Friday morning, and may be ordered direct from the Publishers. Annual Subscription, 17s. 4d.; free by post, 19s. 6d.*

Reading Covers to hold 12 numbers of THE SANITARY RECORD *have been prepared, and may be had direct from the Publishers or through any Bookseller, price 3s.*

Original Papers.

ON THE WATER-SUPPLY OF SEASIDE WATERING-PLACES.

BY G. W. WIGNER, F.C.S.

(*Continued from p.* 310.)

DOUGLAS, in the Isle of Man, was at too great a distance for my assistant to collect the samples there personally, and I am therefore indebted to Mr. J. W. L. Cartwright, clerk to the Town Commissioners, for a sample which he has been kind enough to forward to me. The town has a population of about 14,000, and is supplied with water by a company who derive their supply from mountain springs and rainfall, and pump about twenty gallons per head per day. The supply is constant, except during long-continued dry weather. The sample sent me by Mr. Cartwright was drawn on November 2, and in his opinion may be worse than usual because new storage reservoirs are being constructed, and impurities may be washed into the mains. The following are the results of the analysis:

	Grains per gallon.
Total solid matter	5·90
Loss on ignition after deducting combined carbonic acid	2·20
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	2·69
Hardness before boiling, 1·2° (Clark's scale)	
,, after boiling, 1·2° ,, ,,	
Nitrogen as ammonia	0·0033
,, albuminoid ammonia	0·0033
,, nitrates	0·0800
,, nitrites	0·0040
Total nitrogen in these four forms	0·0906
Oxygen absorbed by organic matter	0·0760

The water had a good pale blue colour, and, when warmed, it had no offensive smell or taste. It was free from suspended matter. The microscopical appearances were generally satisfactory, nothing except traces of rootlets and vegetable fibres being visible. This supply takes rank as a first-class one.

RAMSEY, also in the Isle of Man, is a somewhat smaller place than Douglas. Its residential population is only about 4,000, but this is of course considerably increased during the visiting season. I am indebted to Mr. J. E. Cannell, secretary to the water company, for my sample and for the information as to the character of the supply. The water is obtained from mountain springs and rainfall, and is not filtered. It is supplied under constant pressure to all parts of the town, except at summer time, when occasionally it is shut off during the night, but it is said to be always available in case of fire. The results of the analysis were as follows:

	Grains per gallon.
Total solid matter	5·34
Loss on ignition after deducting combined carbonic acid	1·13
Lead and copper—none.	
Iron—trace.	
Chlorine calculated as chloride of sodium	1·98
Hardness before boiling, 1·4° (Clark's scale)	
,, after boiling, 1·2° ,, ,,	
Nitrogen as ammonia	0·0036
,, albuminoid ammonia	0·0120
Nitrogen as nitrates	0·0260
,, nitrites	0·0020
Total nitrogen in these four forms	0·0436
Oxygen absorbed by organic matter	0·0780

This sample contained a good deal of disintegrated vegetable nuclei apparently of the peaty class, but I could not detect any animal remains under the microscope. The colour was pale yellow, and the smell and taste were both flat and offensive. The albuminoid ammonia is excessively high. The probability is that this water is contaminated with vegetable *débris* from the gathering grounds, and it can only rank as a second-class water.

CLIFTON is a suburb of Bristol. I have not been able to obtain replies to my requests for official information; but as far as my assistant could ascertain on the spot, the water is supplied by a company from the Dundry Reservoir. My information is not decisive enough to say whether the supply is constant or not. The inhabitants complain of the character of the water, which they say is often turbid, and contains living animalculæ visible to the naked eye. My sample was drawn from the main on October 12 last, and the results were as follows:

	Grains per gallon.
Total solid matter	17·00
Loss on ignition after deducting combined carbonic acid	1·18
Lead and copper—none.	
Iron—slight trace.	
Chlorine calculated as chloride of sodium	1·29
Hardness before boiling, 11·2° (Clark's scale)	
,, after boiling, 3·2° ,, ,,	
Nitrogen as ammonia	0·0047
,, albuminoid ammonia	0·0078
,, nitrates	0·0420
,, nitrites	traces
Total nitrogen in these four forms	0·0545
Oxygen absorbed by organic matter	0·0440

The microscopical appearance of the residue was extremely unsatisfactory. The colour of the sample was distinctly yellowish; there were heavy traces of suspended matter, and a slightly objectionable smell. I could not, however, detect any bad taste. It cannot rank higher than as a second-class water.

PORTISHEAD has a population of between 2,000 and 3,000. The water is supplied by a company, who are said to pump it from wells in the limestone to a reservoir on Failing Hill. I am informed that the company have only recently started work. My sample was drawn by my assistant from the main tap at the station on October 12, 1877, and the results were as follows:

	Grains per gallon.
Total solid matter	24·30
Loss on ignition after deducting combined carbonic acid	1·39
Lead and copper—none.	
Iron—very slight trace.	
Chlorine, calculated as chloride of sodium	1·76
Hardness before boiling, 16·2° (Clark's scale)	
,, after boiling, 5·5° ,, ,,	
Nitrogen as ammonia	0·0016
,, albuminoid ammonia	0·0014
,, nitrates	0·0390
,, nitrites	0·0030
Total nitrogen in these four forms	0·0450
Oxygen absorbed by organic matter	0·0800

It will be seen that the results are generally satisfactory, the most objectionable feature being the hardness, but the smell and taste of the water when warmed were most offensive, and the microscope showed that the sample swarmed with bacteria, and other organisms were also present. It is quite possible that these may exercise a heavy disturbing influence on the results obtained by the albuminoid ammonia distillation during the three or four days which necessarily elapse before a water from such a distance can be analysed. But be this as it may, I cannot in the face of the smell, taste, and microscropical results class it higher than a second-rate water. It is reasonable, however, to assume that the contamination comes from the reservoir and not from the wells. If so, this is only the more reason why it should be avoided.

WESTON-SUPER-MARE has a population of some 12,000, and, as far as I can judge, a large relative proportion of visitors. It is supplied by a company, but the works are now being transferred to the local board. The water is said to be obtained from limestone springs, 1½ miles from the town, and is collected in reservoirs, which supply nearly the whole of the town. Some twenty or more houses, however, have an independent supply. On Oct. 12, my assistant obtained two samples, one from the fountain on the Esplanade, and one from the fountain in Regent Street. The results of the former were as follows:

	Grains per gallon.
Total solid matter	56·70
Loss on ignition after deducting combined carbonic acid	8·54
Lead and copper—none.	
Iron—trace.	
Chlorine calculated as chloride of sodium	24·69
Hardness before boiling, 16·5° (Clark's scale)	
,, after boiling, 15·0° ,, ,,	
Nitrogen as ammonia	0·0035
,, albuminoid ammonia	0·0017
,, nitrates	0·5180
,, nitrites	trace
Total nitrogen in these four forms	0·5232
Oxygen absorbed by organic matter	almost none

This water has a good pale colour, but the high proportion of salt (nearly twenty-five grains) gave it a distinctly saline taste, and there was a slight but clearly perceptible smell. The microscopical examination showed that the suspended matter consisted almost entirely of vegetable structures, but the quantity of this matter was very great. The albuminoid ammonia is very low in this water, but the nitrates are higher than would be expected to accord with this. The results of the sample from the Regent Street fountain were so closely concordant with the above that it is unnecessary to print them. This, therefore, appears to be another instance of contamination traceable to a dirty reservoir and neglect of filtration. The waters are second-class ones.

LYNTON, although only a small place, has an unusually large proportion of visitors. The water is derived from a river, but although I have applied to the local authorities for information, they have not furnished me with details as to the character of the supply. My sample was forwarded to me on October 5 last, and gave the following results:

	Grains per gallon.
Total solid matter	4·80
Loss on ignition after deducting combined carbonic acid	1·60
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	1·64
Hardness before boiling, 1·1° (Clark's scale)	
,, after boiling, 1·1° ,, ,,	
Nitrogen as ammonia	0·0034
,, albuminoid ammonia	0·0055
,, nitrates	0·0090
,, nitrites	0·0050
Total nitrogen in these four forms	0·0229
Oxygen absorbed by organic matter	0·0560

The sample had a very good pale-blue colour, and when warmed was entirely free from smell and taste. The microscopical examination showed that it was entirely free from animal *débris*, and contained only minute quantities of vegetable matter, but not more than must be expected in a river water. It will be seen that the total solids and hardness are very low. The albuminoid ammonia is rather higher than in the waters I have reported on last, but taking all the facts into account it must rank higher than they do, viz., as a low first-class instead of a second-class water.

ILFRACOMBE has a population of only about 2,000 or 3,000, but it seems probable that the number of visitors is larger in proportion than in any other town on this coast. It is supplied with water from springs in the slate shale, and the supply is constant.

The water was analysed in 1874 by Mr. Wynter Blyth, who obtained the following results, which I have put as far as possible so as to accord with the mode of statement which I have adopted:

	Grains per gallon.
Total solids	12·60
Loss on ignition	2·80
Chlorine calculated as chloride of sodium	2·49
Ammonia	0·0028
Albuminoid ammonia	0·0070

Microscopical results negative; no forms of life being present. My sample was drawn by my assistant from a main tap at an hotel, on October 11 last, and gave the following results:

	Grains per gallon.
Total solid matter	8·90
Loss on ignition after deducting combined carbonic acid	2·78
Lead and copper—none.	
Iron—rather heavy trace.	
Chlorine calculated as chloride of sodium	2·46
Hardness before boiling, 4·5° (Clark's scale)	
,, after boiling, 4·0° ,, ,,	
Nitrogen as ammonia	0·0031
,, albuminoid ammonia	0·0065
,, nitrates	0·0240
,, nitrites	0·0040
Total nitrogen in these four forms	0·0376
Oxygen absorbed by organic matter	0·0440

It will be seen that the total solids are less than in Mr. Blyth's sample, while the chlorine and nitrogenous constituents are singularly close, when it is considered that an interval of three years has passed between the dates of the analyses. The colour of my sample was an unsatisfactory yellow-green, and there was a distinctly tart or acid smell and taste. The microscopical appearance was not so good as it should have been. On the whole, bearing in mind

the proportion of albuminoid ammonia, it must be classed as just on the line between first and second-class waters.

WESTWARD HO! is a small place, but one which is being put forward pretty prominently to public notice. I have been unable to obtain any official information as to the supply. My sample was obtained by my assistant on October 11, from a main tap at an hotel, and gave the following results:

	Grains per gallon.
Total solid matter	23·50
Loss on ignition after deducting combined carbonic acid	0·25
Lead and copper—none.	
Iron—slight trace.	
Chlorine calculated as chloride of sodium	7·02
Hardness before boiling, 12·2° (Clark's scale)	
,, after boiling, 3·9° ,, ,,	
Nitrogen as ammonia	0·0033
,, albuminoid ammonia	0·0050
,, nitrates	0·0260
,, nitrites	0·0020
Total nitrogen in these four forms	0·0363
Oxygen absorbed by organic matter	0·0200

The colour of the water was a pale yellow, and it had a disagreeable smell and taste. The microscopical examination showed that many bacteria were present. Viewing all these results, this water must rank as second-class.

In my next paper I shall report on the supplies of Penzance, St. Ives, Falmouth, Devonport, Plymouth, Dartmouth, Kingswear, Brixham, Paignton, and Torquay.

ON THE SANITARY AND SOCIAL DEFECTS OF THE PRESENT LAUNDRY SYSTEM.

BY C. E. SAUNDERS, M.D.,
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IT is a healthy sign of the times when people begin to look a little within and to take notice of the surroundings of their everyday life, which have heretofore been too much neglected.

The grosser evils of bad drainage and impure and insufficient water-supply are slowly but surely, under the present health supervision, becoming things of the past, but attention is equally needed to those continuing causes of disease which are intimately connected with our habits of life; for example, overcrowding, the dissemination of disease through unsuspected channels, and its very obvious diffusion through neglect of isolation.

The germ theory of disease owes its general acceptance to the mere circumstantial evidence that by no other known way can an infectant conveyed to a favourable nidus (in quantity appreciable only by result) produce a crop of infective phenomena, which we differentiate according to the clinical aspects of these manifestations. Our only safety therefore is to guard 'the natural gates and alleys of the body' from the reception of a *contagium vivum*, contained possibly in the food we eat, in the air we breathe, or in the clothes we wear.

Fomites are a recognised means of disease-infection, and may attach themselves to clothing coming either from the tailor or the laundress. I have no doubt that to a very large extent infectious disease is propagated by washerwomen, themselves and their belongings being frequently the victims of other people's carelessness, and they in their turn doing mischief by sending from their infected dwellings clothes which retain specific agents of infection, notwithstanding the assumed purification which has been exercised upon them.

The difficulties of tracing such cases is very great, for all kinds of obstacles are thrown in the way of the inquirer; but I can vouch for two instances, during the present epidemic of small pox, of infection conveyed by means of clothing to washerwomen. In the first case, an elderly woman who had not been outside the door of her isolated cottage for many weeks, and who had no personal intercourse with anyone except her daughter and her two sons living with her, was attacked with small-pox and died. Both the sufferer and her daughter had complained of a peculiar odour emanating from some clothing they had washed on a Wednesday; on the Sunday week following (*i.e.* on the twelfth day afterwards) the mother had the rash of small-pox well marked, and died a few days afterwards. Owing to the muddle in which such persons conduct their business it was not possible to trace the clothes to the right owner.

In a second case of small-pox, clothing traced back to an infected source was sent to a washerwoman; she had small-pox and recovered, but her husband, who was also attacked, died. At the time of the attack this woman had the washing of two families in the house. This was carefully dealt with before being returned to the respective owners, and no further harm resulted. Washerwomen seem to be possessed of a very keen sense of smell, and can detect peculiar animal odours in the clothes they are washing; this was so, in the first of the cases I have recorded, and the subject was brought to my notice quite lately by a washerwoman mentioning to the housekeeper of a friend of mine, that the women who did her work had told her that 'whoever owns these clothes (referring to a particular batch) will not be a customer long;' this caused the washerwoman to inquire as to the health of my friend, and she then learnt for the first time that her customer was dying, although very gradually, of old age. My friend did die in a fortnight.

This same woman mentioned other instances when similar remarks had been made to her by her *employés*, respecting persons of whom they could have known nothing; one of these being a young lady, the particulars of whose illness I could not ascertain, and another a gentleman who died after a few days' illness.

I should very much doubt if this faculty of discriminating between the clothes of the healthy and those about to die would bear any severe test, but I refer to it as a curious legend of the wash-tub.

It is not exclusively from a sanitary point of view that I wish to call attention to the defects of the present system of laundrywork, but also more broadly, on the grounds of the thoroughly bad way in which such work is performed. History in this, as in so much else, seem likely to repeat itself, for the subject of laundrywork was not considered unworthy of attention in monastic times, and the cares of the laundry were matters of frequent injunction. Among the precepts the following may be found, in the 'Institutiones Beati Gilberti,' for the order of Sempringham—'De pannis abluendis—Nemo de nostris arripiat sibi potestatem abluendi pannos suos, nil licentiam querere sed eorum providentiæ hæc cura

dimittatur, quibus hæc obedientia a prælatis attribuitur, et sororibus caritatis abluantur et emendantur, ut in XVIII. capitulo ablutionis pannorum monilium continetur. Pedales tamen et capitum ligamenta, et cætera minuta excipiuntur in tempore lectionis, in tempore laboris non.'

In the 'Consuet. Cluniacæ' of Udalric (iii. 8), the monks are thus instructed—'Non suspendant (pannos) ad siccandum in chordâ sed tantum deponant in herbario claustri.'

Clothes on the ground would take longer to get rid of superfluous moisture than those hung for the same purpose on a line. Possibly the good father meant to enjoin the use of damp clothing as a salutary penance for his spiritual children.

Laundresses never seem to have enjoyed a very enviable reputation, and were numbered among the articles prohibited in the chambers of the Inns of Court in the days of Elizabeth. For it was ordered that 'no laundresses should henceforth come into the gentlemen's chambers of this Society (Gray's Inn) unless they were full forty years of age, nor send their maid-servants of what age soever into the said gentlemen's chambers, upon penalty, for the first offence of him that should admit of any such, to be put out of Commons; for the second, to be expelled the house.'

Whether the morality of the present generation of laundry-workers differs from that of the days which I refer to above I do not know, but I conclude from a letter of Mrs. Susannah Meredith's to the *Times* some weeks ago, which she refers to as 'a public appeal for the suppression of their (*i.e.* the laundry-workers) misdirected industry,' that drunkenness, at all events, is their besetting sin. Be this as it may, the utter incompetence of the persons by whom laundrywork is at present performed is only too familiar to every housekeeper. The mistakes which occur show what a want of method there must be in the management of laundries, and are conclusive proofs of the mixture of clothing belonging to different owners; for scarcely a week passes without some of A's clothes being returned to B, and *vice versâ*. And even worse than this is the fact of articles getting mislaid and not returned at all. I am informed that at the present time no less than seven articles (ranging from a counterpane to a handkerchief) have not been received from the washerwoman, whom I myself employ.

The stock in trade of a washerwoman is very limited, and anyone having a local habitation can 'take in washing.'

The rooms in which much of the washing of London is done are to be found in most of the back slums, and in such confined spaces the risk of infection is very great, not only from clothes sent from infected houses, but from the fact of the frequent occurrence of infectious diseases in or near tenements so situated; the steaming atmosphere produced by washing clothes being the very one of all others to hold up and diffuse infected particles. From the laundress clothes frequently pass to the mangler, a person whose business is carried on in a still smaller space.

A glance at the census returns will show the large number of people engaged in laundry work in London alone. In 1871 the number of 'laundry-keepers' (females) was 43,998, while 987 males in addition were engaged in laundry work; 503 females were employed as private laundrymaids. The total population being 3,254,260, we have one female laundry-keeper to every 73·9 of population. Among the occupations of the total number of the female population (1,731,109), we find laundry-keepers standing third on the list. Domestic servants (general), by far the most numerous of any one occupation, number 139,858; then come milliners, 58,460, then laundry-keepers, 43,998; the next most numerous being shirtmakers and seamstresses, 26,875, and so on.

The gross amount of income earned by laundry-work is very considerable, for if only sixpence a head of the total population were allowed for laundry purposes per week, the annual expenditure would be 4,230,538*l.* If this were divided equally among the 44,985 number of laundry workers, male and female, it would give an annual income of 94*l.* to each—a very substantial wage for the class of people employed—and if economy of labour and material were brought to bear upon the industry, the net income would be much larger than it is at present. The cost of the raw material—soap, soda, starch, and blue—is very much less than formerly, while the prices charged by the laundry keepers have increased.

The interest of the washerwoman in the articles she washes exceeds their prime cost; for instance, a dozen shirts may cost 4*l.* (I take a commonly advertised price, viz. six for 4*os.*); this sum represents the united interests of the producer, the cotton-spinner, and shirtmaker. The shirts may last three years, and if three shirts at three-pence apiece are washed each week, the total cost of such washing—*i.e.* the washerwoman's interest in such shirts—is no less than 5*l.* 15*s.* 4*d.* If laundries were established on a large scale, and with proper appliances, very great savings might be effected in every department of their working. For example, in every 100 gallons of Thames water used, 30 ozs. of soap are wasted before a lather is formed, and if the water used for laundry purposes were previously softened by artificial means, one-tenth of the sum expended for soap and soda might be saved. The economy to the clothes themselves would be enormous. Bacon says, 'Chalky water is too fretting, as appeareth in laundry of cloaths, which wear out apace.'

It is, too, quite possible to recover the soap once used, both from the water in which it is dissolved, and from the substances it has dissolved. This was actually done by Houzeau Muiron at Rheims, and in some of the woollen manufactories in the work of England a modification of the process is still adopted.

The method, as carried on by Houzeau Muiron, was as follows: The soap-water in which woollen stuffs have been freed from fat is collected in reservoirs. The water contains suspended in it some lime soap (formed from the lime in the water), it contains dissolved the soda-soap, and along with this the unchanged fat and animal matters extracted from the wool. From all parts of the town this soap-water is collected, and subsequently treated with a small percentage of sulphuric or hydrochloric acid, the action of which is that it removes the base of the soap; consequently the fatty acids of the soap are set free, and along with the fat and animal matter the soap had dissolved, float upon the surface of the water. This mixture is collected and melted with a little sulphuric acid to effect its clarification; the clear oil thus obtained is treated with crude soda (containing sulphide of sodium),

forming a very tolerable soap, whilst sulphide of iron, together with a solid black residue containing much fat, is precipitated. This black solid matter is collected, and used for making gas, so that both soap and gas is obtained from soap-water; the soap is made from the fatty acids of the used soap, and the gas from the substances the soap had dissolved by virtue of its detergent action (Galloway's 'Chemistry'). As at present, the disposal of slop-water in small towns and villages is one of the great difficulties of sanitary administration, we might hope to see slop-water turned to some such useful purpose as the above, and a positive nuisance turned to some useful account.

With a view of forming some idea of the time and plant required for washing the clothes of a large number of people, I have, through the courtesy of Dr. Duckworth Williams, the medical superintendent of the Sussex County Lunatic Asylum, ascertained the following facts: The number of persons whose clothes are washed every week in the Sussex County Asylum is 900. From 6,000 to 8,000 articles go to the wash weekly, each patient having two changes of linen at least. The whole of the washing for this large number is done in two days, the ironing, etc., occupies two more days, and the remaining days of the week are occupied by folding, sorting, and delivering to the respective wards.

Sixty patients are engaged in laundry work, but many of these do scarcely any work; in addition, there are four paid laundrymaids. Two washing machines and one wringing machine are used, and these are worked by steam. Foul linen is kept quite distinct in a separate laundry, and washed by different women to those engaged in the general laundry. There are two drying closets in the general laundry and one in the foul linen laundry. Infected clothing is washed in a laundry attached to the infectious diseases block, quite away from the main building. The buildings for laundry purposes occupy a space of 150 ft. by 30 ft., arranged in the following order—sorting-room, laundry, drying-closets, washhouse. The foul linen washhouse is extended beyond these. Attached to the general laundry buildings there is a large drying-ground ab ut 150 ft. by 200 ft. in size. The number of hands employed is no guide as to the number required; it is not possible, therefore, to estimate the cost of labour, but, if only one penny was received for each article washed, a gross annual income of 1,730*l.* would be realised. The total cost for all material used, except firing, is about 32*l.* a quarter.

The estimate of receipts is put so low by me that it does not offer, as it stands, any very tempting inducement to promoters of model laundries, but I believe all the estimates I have calculated might be very well doubled, and still be much within the mark. I do not believe, however, that large companies with enormous capital will ever succeed in laundry work, but I am equally certain that a limited capital, judiciously applied to set going on a complete plan a laundry business, would secure very considerable returns.

The elements of success are systematised work and the adoption of every possible sanitary precaution, so that not only may the petty annoyances incidental to domestic washing be avoided, but the confidence of the public secured, all fear of infection being allayed by the precautions used, and a 'misdirected industry' replaced by rule and order.

The system of 'sweating,' as it is called among tailors, is one much calculated to spread infection. The workers take home the materials and make them up in their miserable dens, the clothes in the meantime being exposed to the air of the room, until finished and taken to the shop. A case of scarlet fever communicated by an infected riding-habit is one instance within my own knowledge in which disease was conveyed from the seamstress.

METROPOLITAN PURE SEA-WATER SUPPLY.

IV.

IT has been ascertained that the whole of the London Public Swimming Baths would contain about one million and a-half gallons; and assuming that all of them took a full quantity only every second day, the total weekly consumption would amount to four and a-half million gallons, or a daily average of 750,000, leaving 4,250,000 for private consumption in the Metropolis. Bearing in mind that London contains more than half a million houses, it can readily be understood that there will be no difficulty in obtaining customers among so many for only four and a-quarter million gallons, and the number of houses that would probably take the supply has been put down at 60,000, being about 12 per cent. of all London. Some of these would use only a small quantity daily, and others a very large quantity. Generally speaking, the consumption of sea water would be found to vary according to the rent of the dwelling-house and its situation in the aristocratic or middle-class districts, but the moderate charge does not preclude any householder paying a rent of 40*l.* from obtaining it, and guaranteeing a consumption of not less than 25,000 gallons per annum equivalent to about 2*l.* 10*s.*, reckoning at the lowest probable rate of 2*s.* per 1,000 gallons. In the swimming-baths the water would be constantly flowing in and running to waste, thus keeping up a continuous circulation, so that each bath would be renewed in two days as already stated. It is anticipated that there would be hardly sufficient water to spare for a daily renewal of all the London swimming baths. But the difficulty might be met in another way, by having fresh water and salt water in these baths on alternate days, which would make the daily consumption about 750,000 gallons, as above stated, leaving the quantity for private use the same as before. The question of supply to public baths and private consumers is one of considerable importance, as it must not be forgotten that the total capacity of delivery in London is limited to 5,000,000 gallons daily, and it is desirable to permit all public institutions requiring the sea-water to obtain as much benefit as possible from it, whether public baths, hospitals or hotels. Taking into calm consideration the requirements of public and private consumers, it cannot be questioned that the full capacity of the great boon will always be taken advantage of every day throughout the year. It is this point which is sought to be established in the interest of the prosperity of the undertaking financially, and it may safely be accepted without cavil that every gallon of sea water would be used to the full limit of the daily supply, affording an annual gross income of about 250,000*l.* upon an outlay of 1,500,000*l.*, making a handsome percentage of profit a certainty, even if eventually a considerable reduction should be made in the rate per 1,000 gallons, owing

to the prosperity attending the good and economical management of the pumping and distribution. Taking another view of the subject, it may easily be supposed that out of all London a greater number than 60,000 houses would gladly have the supply laid on, and take whatever quantity they could obtain of it, which would not be very much, seeing that the average daily quantity left for the first assumed number is only about seventy gallons, not too much for an average family of five persons. In this case the general result would be a better distribution and more certain consumption, but each household must of necessity use a less quantity. People would remember that in reality they were in the enjoyment of a great luxury all the year round, and, notwithstanding the economical cost, they would be chary of using too much water, so as not to deprive their neighbours of their due share of it.

The power of pumps and size of mains will be so regulated that 2,000,000 gallons in addition can be distributed among the various towns, villages, and mansions between the sea and London, and assuming that the whole of this quantity were likewise to be taken up, the total income upon 7,000,000 gallons per diem at 2*s.*, the reduced price, would amount to 255,500*l.*, and expenditure not more than 90,000*l.*, leaving a profit of 165,500*l.* upon the reduced rate, being rather more than the previously reckoned net income by about 5,000*l.* These figures appear to be almost too favourable a result of what some may denominate so uncertain an undertaking on so large a scale, when no previous calculations founded on fact can be adduced as an evidence of their soundness; and yet it cannot be doubted that, given the supply and demand, these results should be infallibly realised soon after the inauguration of the completed project. It is highly important that the investigation of the whole subject should be as complete as a preliminary view of the undertaking will permit on my part, and that every side of the subject should be considered conscientiously without any attempt at adornment or exaggeration, but presented calmly and in plain language, so that ordinary and unprofessional readers can comprehend it without difficulty, and 'that he who runs may read.'

As this question is a matter of very great importance to the ratepayers of all London, it is absolutely necessary that it should be explained in a clear and convincing way to the understanding of the great majority of the people, whose united action would then carry weight towards the attainment of so great benefit to the metropolis. It would appear that as those most interested in the success of this undertaking are the ratepayers, the most competent authority to undertake the construction and preparation of the necessary works are the Metropolitan Board, who would not be engaged in an unremunerative sanitary work, but in an undertaking certain to return a handsome profit on the outlay, and permanently adding to the general welfare and health of the whole of London. The poorest as well as the wealthiest will most certainly benefit in health through the introduction of an abundant supply of pure sea-water, always at command throughout the year in every part of London, in private houses, hotels, public and private baths, and to be purchased in small quantities for a trifle from any one who is willing to sell it to their poorer neighbours who cannot afford to have it laid on.

Let it be proved clearly to the satisfaction of the Metropolitan Board of Works and the ratepayers of London that an abundant supply of pure sea water can be obtained in the manner indicated, and at the estimated outlay, and it may safely be stated that the former will not stand in the way of the latter obtaining their desire in so great a blessing and luxury for this overgrown city, requiring all the sanitary improvements that can be devised or compassed at a moderate expenditure for its welfare. There is the pure sea, a vast fountain of health; here is mighty London groaning under innumerable disabilities in the shape of disease and discomforts. Bring the one to the other in abundance, and a great mitigation of both disease and discomfort will be effected, and a healthier life promoted throughout a vast population.

The head of 500 feet, although more than 50 miles away from the centre of London, will give a very considerable pressure in every part of the metropolis, in spite of the fact of the continual demands upon the supply, and it is proposed to utilise this pressure to arrest an outbreak of fire in any dwelling having the supply laid on. Every service pipe would have a diminutive hydrant fitted to it in the interior of the house, and every tap would have an outside thread of the same size as the hydrant, to which flexible tubing of any requisite length could be attached by a screw union in a few seconds, and by a turn of the valve or tap, as the case might be, a powerful jet of sea water could be turned on to extinguish incipient fire in any part of the house before much damage could be done. This supply would be much too expensive to use for the purpose of extinguishing a fire that had taken firm hold of any premises. All those householders having this supply laid on would thus have the tremendous advantage, frequently of the most vital concern, of being able to cope with an outbreak of fire, and probably save life and property, independently of the fire-engine and brigade. There are numberless cases in which five minutes' of a small supply of water at the beginning would have saved a great conflagration and enormous destruction of property, causing irreparable loss. The presence of sea water under great pressure will no doubt meet many of these cases, and arrest what would otherwise prove a great fire, at its outbreak, and be the means of preventing great loss of life and property. The Fire Insurance Companies will readily recognise the inestimable value of the sea-water supply in a dwelling-house or building of any description, by moderating or reducing their rates, as their risk will be much less under such circumstances than it usually is now when the means immediately at hand are usually utterly inadequate to cope with any ordinary outbreak of fire. S. M'B.

AT a meeting of the local board of Saffron Walden it has been decided to purchase the water works and gas works, on the report of the committee appointed to consider the question. The price at which they are offered is—for the water works, 6,400*l.* and the gas works 10,300*l.*; total for both, 16,700*l.* It is estimated that there will be a profit of 150*l.* arising from the gas works; at present the water works do not pay, though there is a steady rate of increase in revenue. It is proposed to borrow the money of the Government for the water works, at 3½ per cent., to be repaid in thirty years by equal yearly instalments. For the gas works it is proposed to borrow of the insurance companies at 4½ per cent., repayable in thirty years. It is estimated that the revenue from the works will meet these payments.

THE
SANITARY RECORD.
FRIDAY, NOVEMBER 23, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

TYPHOID FEVER IN LANCASHIRE.

A FIRST perusal of the letter from our correspondent 'Aquaregia,' page 337, would lead to the opinion that he had imported the stinging effect of his *nom de plume* into his letter, but a perusal of the report of the meeting of the Accrington Urban Sanitary Authority as published in the *Accrington Times* of November 10 shows that it would be difficult to summarise the opinions which obtained at that meeting better than in our correspondent's own words, 'Wod hez he getten to do wee't.' Unfortunately for the public good, sanitary authorities sometime belie their name and become unsanitary authorities, and when this is the case it becomes part of our duty as the SANITARY RECORD to take the matter up and call the authorities to a proper sense of their responsibilities despite even excited statements by those who are interested more on behalf of water companies than of the public. We reply in our own words, 'We have done our duty fearlessly, the local authorities *must* now do theirs.'

If the matter was not a serious one as affecting the health of some few thousands of people, it would be possible to have a pleasant smile over such an exhibition of 'how not to do it' as the records of this sanitary authority meeting afford; but when human lives are imperilled, we can only regret such crass ignorance as was displayed. One member (we do not like to hand his name down to posterity) said, 'The excitement is enough to kill some,' and further that 'he did not care to read startling reports in the papers.' We suppose this excitement was produced not by drinking polluted water, but by becoming aware of the fact that they are drinking it, and it certainly is not open to us to question the word of a guardian of public health who objects to improvement on the ground that 'what is must be,' and therefore he does not care for the reports.

Other members of this model board appear to be desirous of becoming amateur sanitarians. One gentleman 'had no doubt the water had been impure for a long time,' but he 'did not believe in that urinal impurity.' Another was 'opposed to public feeling being excited,' and a third ventured the random assertion that 'the SANITARY RECORD was in the hands of medical officers who wanted to raise a scare and raise their wages,' and further that 'as typhoid fever had occurred in the household of the Prince of Wales it was likely to occur elsewhere. Perhaps the best answer to this gentleman is to parody a part of Milton's epitaph, and say:

> The force of *folly* could no further go,
> To make a third it joined the former two.

But there is a sadly serious side to this subject as well. Had we not taken it up as we have, the matter (merely local and unimportant as this board in their united wisdom considered it), would have been passed over and ignored, and the 'liquid mud' of which the medical officer of the district speaks, would have been doled out day after day to the inhabitants. The water company, practically uncontrolled, simply because it was no one's business to keep them up to their duty, would have gone on using the Burnley Road reservoir, which has not been cleaned for twenty years, for twenty years more, and if the medical officer had ventured to remonstrate, perhaps the result to him (who appears to have done his duty) would have been even worse than the putting up to open competition of the reappointment to the office he at present holds. Local self-government is good in theory, but when such results as this accrue from it in practice, a doubt naturally arises whether it is not necessary to place more restrictions on it.

When years ago a contemporary called attention to the enormous adulteration of food, the traders and adulterators complained in no measured terms; but legislation was brought on by those reports, and the successive steps which have been taken have been sufficient to give us a fairly satisfactory supply of food. We are now determined, in the same way, to go to the bottom of the question of water-supply. Here, as in the food case, we have tradesmen, or trading companies, selling an article as a pure one; the public purchase it as a pure one, and if it is not so, the latter ought to be warned what it is they are purchasing. At present we have no legal machinery by which this warning can be given; it is no one's business to analyse these waters, and consequently, unless public attention is called to the matter, the supply of a small town may be water or—sewage!

As to Accrington, we have achieved our object. Dr. Angus Smith is to be asked to investigate the matter; it could not be put into more able hands, and we are quite certain that if he undertakes it, he will find out the source from which the 'liquid mud' comes, and also investigate the other three sources of supply which, according to our correspondent 'Aquaregia' and the *Accrington Times*, were not seen by the members of the board, who were, as the chairman said, supplied by the water company with 'a good tea' on the occasion of their visit to inspect the waterworks.

VACCINATION CERTIFICATES AND SHAM VACCINATION.

WHILE every small-pox epidemic since the days of Jenner has afforded increasingly abundant evidence of the value of vaccination, it is scarcely unreasonable that the opponents of vaccination should point to the epidemic prevalence of small-pox in a country in which compulsory vaccination has been in operation for more than twenty years as proof of its failure. Those who believe most implicitly in the efficacy of true vaccination should be the first to acknowledge that fatal prevalence of small-pox in England at the present time among persons under twenty years of age must imply either a failure of vaccination, or the failure of the system which professes to carry out compulsory vaccination. It is scarcely necessary to say that the overwhelming evidence in favour of the efficacy of true vaccination leaves no alternative but conviction of the comparative failure of the vaccination system to effect its object. Dr. J. L. Hamilton has done good service by calling attention to the amount of sham vaccination which is taking place, and the number of sham certificates of successful vaccination which must be issued and recorded in the vaccination register. Without venturing to endorse all that Dr. Hamilton writes as to the way in which vaccination is performed and certified 'by quacks, who, without knowledge, training, or qualifications, style themselves midwives, druggists, herbalists, chemists, or doctors,' sham vaccination undoubtedly exists, and it is highly important that the fact should be looked in the face in order that a remedy may be provided. Let us glance at a few figures relating to the recent small-pox epidemic in London, which have an important bearing upon the question under discussion. During the year and a half ending June last 2,755 deaths from small-pox were registered in London, of which 775, or 28·1 per cent. were of children under five years of age. It may be noted that during the epidemic of 1871-2 the proportion of deaths of children under five years was 36·6 per cent., from which it may be inferred that since 1872 vaccination has either become more general or has improved in quality. Still the fact remains that in a population under five years of age, of which, according to official returns, 91 per cent. are successfully vaccinated, 775 fatal cases of small-pox were recorded. Of these, 495 were certified to be unvaccinated, 42 to be vaccinated, and in 237 cases the medical certificates did not give any information as to vaccination. Believers in vaccination are naturally sceptical as to reported cases of fatal small-pox among successfully vaccinated children aged under five years, and the Registrar-General has stated with regard to the 42 fatal cases certified as vaccinated, that on inquiry the evidence of successful vaccination previously to the period of infection almost invariably broke down. As regards those cases certified as unvaccinated investigation is also called for. Antivaccinators do not scruple to assert that many children who die of small-pox and are subsequently certified as unvaccinated, have previously been entered on the vaccination register as successfully vaccinated; indeed one or two such cases have been discovered, which have been urged by the opponents of vaccination as evidence of its failure, whereas the cases only afforded proof that the children had been improperly certified as successfully vaccinated. There are two grounds for carefully investigating these fatal cases of small-pox among children under five years of age certified as unvaccinated. If on investigation it were discovered that any considerable number of the cases were of children originally certified as successfully vaccinated, although having no marks when attacked by small-pox, so serious a flaw in the vaccination system would demand remedy. On the other hand it could not but be useful to attempt to trace how so many children escaped the provisions of the Compulsory Vaccination Act. In order to prove the extent of sham and useless vaccination which now takes place, it is only necessary to refer to the results of recent school inspections, which show that fully 20 per cent. of the children examined were either unvaccinated, or inefficiently vaccinated, although at least 91 per cent. had been certified as successfully vaccinated. Reference to the vaccination registers should moreover render it possible to trace the authors of the sham vaccination and sham certificates. It is not perhaps generally known how large a proportion of vaccinations are in some localities performed by private practitioners; it is reported, for instance, that of 661 vaccinations in Marylebone during August and September, 63 per cent. were performed by private practitioners. It is impossible, therefore, without careful investigation, to know to what extent public vaccinators are responsible for the undoubtedly large proportion of worthless vaccination which has been observed in schools and in small-pox hospitals. In order to disarm the opposition to vaccination, the organisation of our vaccination system needs over-hauling. Many children now without doubt escape vaccination, but a still larger number receive scant protection from what has been called sham vaccination. The sooner that the Local Government recognises this fact the sooner may we hope for an improvement of the system.

Notes of the Week.

AT Crook, the proposed adoption of the Local Government Act has been rejected by a large majority.

COMMITTEES have been appointed by the Justices of Cambridgeshire, Huntingdonshire, the Isle of Ely, and the Borough of Cambridge, to confer as to the advisability of making a joint appointment of a public analyst, vice the late Mr. Apjohn, and to report to the respective courts at the Christmas quarter session.

THE result of the Vestry of Islington taking upon themselves the duty of collecting the dust and slopping and watering the roads, has not only resulted in the work being well done, and a consequent lessening of complaints, but also a saving for the year of 1,072*l.*

A CONTRACT has just been signed for the due execution of the sewage works at Sawston in the Linton Union. Mr. Morley, of Cambridge, is the engineer. The sewage will be disposed of by intermittent irrigation, osier beds forming a prominent feature in the scheme.

THE usual official inquiry is about to be held by the Local Government Board previously to final sanction being given to the plans for the drainage and disposal of the sewage at Eaton Socon, St. Neots. Mr. Jackson, the surveyor to the St. Neots local board has prepared the scheme, which is on the intermittent filtration and irrigation system. The sanitary authority propose to borrow the necessary money, so as to spread the re-payment over as long a period as possible.

SILICATE PAINT.

THE architect of the Victor Emanuel Gallery, Milan, Signor Mengini, directed that a part of the interior walls should be treated with the petrifying liquid of the Silicate Paint Company, Liverpool and Cannon Street, in order to observe the effect of the material. It was watched for the term of two years, and the result was so satisfactory to the architect that the municipality were recommended to apply the liquid throughout the structure. A special scientific investigation was, however, directed to be undertaken by the official assessor. The material having undergone this ordeal, a contract for a supply has been entered into with the company.

THE LONDON WATER-SUPPLY.

ACCORDING to the monthly report of Colonel Frank Bolton, the state of the water in the Thames and Lea was very good during October. Of the companies drawing their supplies from the Thames, the West Middlesex, East London, and Lambeth have sufficient storage capacity and impounding reservoirs to avoid taking in water when floods prevail. The Chelsea Company have completed the construction of the four new subsiding reservoirs at Molesey, and the Southwark and Vauxhall and Grand Junction Companies have acquired land for the construction of suitable storage reservoirs and other works at Hampton. The water in the Thames at Hampton, Molesey, and Sunbury (where the intakes of the West Middlesex, Grand Junction, Southwark and Vauxhall, Lambeth, Chelsea, and East London Companies are situated) was very good. The highest flood state of the river at Hampton during the month was 9 inches above, and the lowest was at the summer level. The condition of the water at Ditton was also very good.

THE PARKES MUSEUM OF HYGIENE.

THIS museum, which is in course of formation at University College, Gower Street, is in a fair way towards completion, and will soon be available for the purpose of diffusing a practical knowledge of many branches of sanitary science. The executive committee consists of the Professors of Medicine, Hygiene, Architecture, Engineering, Chemistry, and Surgery, and their aim has been to make the museum as widely useful for teaching purposes as possible. The Council of the College have devoted an area of 3,500 ft. for the purposes of display, and contributions in the shape of books, charts, plans, models, apparatus, etc., are arriving almost daily. The India Office, the Museum of Economic Botany at Kew, the South Kensington Museum, the Hygienic Department of the Army at Washington and the city of Brussels, besides many manufacturing firms and individuals, have already made valuable contributions. The museum is divided into a library and eight classes. The library will be devoted entirely to works on hygiene, reports, pamphlets, etc. Class 1 is devoted to local hygiene and sanitary engineering, and will consist mainly of plans, views, drawings, etc., illustrative of drainage, sewerage, water-supply, burial, and the hygiene of crowded districts. Class 2 deals with hygienic architecture, and will be illustrated by plans and drawings properly classified and packed in portfolios for easy reference. Class 3 illustrates the important subjects of lighting and warming; Class 4, clothing; and Class 5, food. This will be, perhaps, the largest class in the museum, and will be illustrated by specimens, drawings, models, etc., and will deal with the important subject of diet from every point of view. Class 6 deals with personal *régime* and comfort for invalids, including the transport and care of sick and wounded in battle; Class 7 with safety and rescue; and Class 8 with the hygiene of the professional and industrial classes. An elaborate prospectus has been printed and circulated, at the expense of Mr. Twining, of Twickenham, who has been most generous in his contributions to the museum, which will be forwarded to any persons interested in hygiene on application to the secretary of the Parkes Museum, University College, London.

Special Reports.

MEETING OF MEDICAL OFFICERS OF HEALTH.

THIS meeting was held on the 16th at the Cannon Street Hotel, in consequence of the Scottish Corporation Hall having been burnt down. Dr. Stevenson, President, was in the chair, a large number of visitors and members being also present. Letters were read from the Society of Arts and the Social Science Congress offering the use of their rooms for the meetings of the society, when it was decided to send a vote of thanks to each society for their kind offers, and to hold the next meeting at the Social Science rooms, as they are more suitable for the purpose. A vote of sympathy was then passed and directed to be sent to the managers of the Scottish Corporation. The report of the council was then brought up recommending the meeting to adopt the following resolutions passed at a council meeting. First, that in the opinion of the Society it should be a legal obligation on the medical practitioner attending a case of infectious zymotic disease to certify its nature in writing to the occupier of the house or vessel where the sick person is lying, and on the occupier to give notice of the existence of the infectious disease to the local sanitary authority. After some discussion this was agreed to, as well as a recommendation that a copy be sent to the President of the Local Government Board, to the Metropolitan Board of Works, and the public press. The second recommendation that the Society take no action as regards the Building Bill until it be printed was not carried, as an amendment was proposed by Dr. Tripe that the Metropolitan Board of Works should be requested to insert a clause in the Bill giving power to the metropolitan vestries and district boards to make bylaws as regards means of drainage and of water-supply for domestic purposes in the same manner as is possessed by extra metropolitan sanitary authorities, subject to the provisions by the Metropolis Local Management Acts, and of the new bill, and to confirmation by the Metropolitan Board of Works—carried.

Professor Ansted then read his Paper on Rivers and their relation to public health. He said that he had for a long time past paid much attention to this subject, especially as regards the geological and physical facts. He pointed out the importance of running water in the domestic and social economy of the world and in the building up of organic substances. That the circulation of water is affected by the rainfall, evaporation, absorption by plants, etc.; that the water of rivers and streams is derived from

rain, although only comparatively a small part runs off, except during storms, or in the winter months. That the proportion running off depends on many causes, such as the configuration of the banks, the nature and condition of the surface, whilst the purity of the stream varies with the deposits on the surface of the ground and the structure and composition of the soil. That the purest water is that derived from the atmosphere in the form of rain; that springs are derived from rain, and are contaminated with the mineral and other matters forming the soil through which the rain penetrates. That water obtained from Palæozoic rocks, is generally good, and the same remark applies to water from chalk except that it holds in solution much carbonate of lime, and is consequently hard. That lake water is also usually good, whilst that procured from gravel at small depths, is generally doubtful, as it has travelled but a short distant from the surface, where it has absorbed or been mixed with impurities. That rivers, although polluted in many ways by excrementitious and other foreign matters, purify themselves by the oxygen absorbed from the air, so that undrinkable water speedily becomes drinkable, unless strongly contaminated, without more risk than occurs in the ordinary pursuits of life; but in some cases so much drainage matter has been carried in as to render them 'unfit' for domestic use. He believed that towns built on rivers are more healthy than others, although some few rivers are injurious to a certain extent. He also adverted to the doctrine of 'previous sewage contamination,' and pointed out that the nitrogen found in water may be derived from other than animal matter. He considered lake better than river water, but believed that the risk from using the latter was much over-estimated, and objected to legislative interference with the use of rivers, as it would be likely to inflict a mortal injury on the manufactories which drain into them.

The President proposed a vote of thanks, which was carried unanimously, and said he should not discuss any of the interesting points brought out in the paper until later, and called upon Dr. Bartlett, who asked Professor Ansted if it was to be accepted that impurities can be so far removed as to render the water safe for drinking. He considered that nitrates and nitrites are dead, so far as injury to health is concerned, and that as some water that does not contain organic matter is unsafe, he would also ask what is the meaning of 'deleterious' as regards its organic and inorganic constituents. Dr. Ratcliffe said that practically speaking the question as to the best water-supply is not either entirely chemical or geological, but that the natural history of the supply should be considered in relation to its chemistry and geological source. Dr. Bischoff asked the Professor if he considered that contaminated water might be safely used, provided that all the organic matter formerly in it were oxydised. He thought water obtained from the Thames is wholesome, except at times of flood. Mr. Bailey Denton referred to sewage contamination, and asked, if sewage be allowed to go into rivers, are we safe? and if it be not allowed to drain into them, where is it to be discharged? Dr. Tripe said, as an officer of health he considered that drinking water should be obtained from those sources which are least liable to pollution, and objected to filtration being trusted to for separating noxious matter, as he did not believe that living germs can be oxidised in the same way as dead matter, or be separated by filtration. That he thought the proposal to sink wells in the chalk is advisable, although the quantity to be obtained is not unlimited. Dr. Whitmore expressed a doubt whether lake or spring water is the best, as the latter is usually hard, and may cause calculus, as at Norwich. Dr. Stevenson (president) said as medical officers of health they were more concerned with the freedom of water from organic matter, as the presence of inorganic substances is comparatively unimportant. That the greatest difficulty is to decide at what stage of degradation organic matter ceases to be injurious, but he considered that water fouled with excrementitious matter is at the least of suspicious quality, and objected to surface water, because simple filtration cannot be depended upon to remove all pollution. Professor Ansted then replied by saying that he had not alluded to filtration, as it did not necessarily belong to his subject, although it had an important relation with it. That he did not consider water from chalk as essentially filtered water, because it passed from one part to another through fissures or large channels, so that organic matters may still remain in it, also that the supply is by no means unlimited. When water circulates through sandstone it does so chiefly by the fissures, and when through slaty rocks entirely in this way. That water obtained from rivers is not fit for use if, when the supply be taken, it contains excremental matters, and, as regards disease germs, that so little is known concerning them as to place them outside the discussion, for they might as well be found in spring as in river water. That it is necessary to get rid of sewage somehow, because the soil cannot always decompose the organic matters in over-populated districts, and it must therefore be removed by the agency of water or by burning. The meeting then adjourned.

DISCOLORATION OF SOUTHAMPTON WATER.

ON Friday, the 16th inst. at the Hartley Institution, before the members of the Southampton Literary and Philosophical Society, Mr. Arthur Angell, the county analyst, read an exceedingly interesting paper on a certain brown coloration which, if not peculiar to the Southampton rivers, is at least more highly developed there than in most other estuarine waters. His investigations had arisen from certain microscopic observations communicated to the members of the society last session by Mr. Rogers, who attributed the phenomenon to the presence of moving microscopic organisms, of animal origin, whilst the popular belief, joined in by yacht-owners and captains, watermen and others, attributed it to the decay of the spring growth of sea weeds. For the last five months, therefore, he had paid attention to this subject. This year the peculiar colour, sometimes resembling muddy coffee, and at others something between that and red iron rust, appeared in the early part of the month of June and continued until late in October, when the nights became frosty. This brownness colours the whole of the water down to Netley Hospital, its effects being more marked in some places than at others, it being found at high water most concentrated at or near the shores, the deep water being comparatively free, but sometimes hanging about in clouds at particular spots, between which comparatively clear water may be seen. At dead low water a bottleful may be taken out clear and bright, arising from the freshets on the surface, whilst every stroke of the oar will bring up in eddies clouds of brown colour. At the verge of the green oceanwater, this colour is mapped out with a striking sharpness. It never appears to reach Calshot, as before the ebb tide reaches the spit it is stopped by the flood tide, which appears to carry it back to Hythe, or thereabouts—showing that it is an error to suppose we get a fresh supply of sea water in our river at every tide. A sample of the coloured water being dipped and held to the light appears of a pale reddish-brown tint, which the naked eye will show is due to the presence of countless myriads of fine brown points, as if some minutely divided brown dust or iron rust was suspended in the fluid. The whole of this colour, on the bottle being allowed to stand, will fall to the bottom, leaving the upper stratum of water quite clear, but if the bottle be turned bottom uppermost the stuff will fall in a flocculent mass, and is not again evenly distributed, unless briskly shaken; whilst if a small quantity of the subsided matter be taken up in a dipping tube, it will be found difficult to let a part flow from the tube without letting the whole out together; this is because these little brown things surround themselves with a gelatinous medium. Exposed in a glass of sea water to the direct rays of the sun, they show symptoms of increased vivacity with a bold eager front towards the light, and bubbles of

gas are evolved which can be none other than oxygen. A drop of this water shown under a one inch objective contains hundreds of specimens of semi-transparent brown coloured bodies, filled apparently with highly refractive granular matter, these creatures being of a peculiar shape and very active in their movements, each furnished with a belt of cilia around its waist, and a long transparent and exceedingly flexible tail. After death they give off an odour similar to that of seaweed, and change their colour to green—doubtless indicative of the presence of chlorophyl. All these facts led Mr. Angell to the conclusion that these creatures are of vegetable origin, and in his further investigations—which he described—he found they figured in the microscopic dictionary as a species of *Peridinium fuscum* — an animal organism, but taking his own observations, apart from anything gained from books upon the subject, he was strongly of opinion that they were microscopic plants, the reason for which conclusion he gave to the meeting. These creatures peform the functions of living vegetables existing upon the products of the decomposition of dead organic matter and hastening its perfect oxidisation and final destruction. Man vitiates the river by pouring into it filth enough to render the water, especially in hot weather, a stinking abomination, but nature sends this vast army to fight the enemy, and the water is kept sweet. When sewage no longer flows into the river the *Peridinium fuscum*, no longer needed, will speedily disappear, leaving the water a pure and translucent green.

Law Reports.

ADULTERATION OF MILK.

AT the Preston Borough Police Court, on Monday, October 22, Alfred Smith, provision dealer, was summoned for selling adulterated milk. Inspector Cave called at the defendant's premises on the 20th ult., and bought a pint of milk. He asked Mrs. Smith if she would like to keep a third of it, as he was going to have it analysed, and she elected to do so. He labelled it and forwarded it to Dr. C. Brown, county analyst, Liverpool, who gave a certificate, which was produced, that the milk contained 35 per cent. of water. Defendant was fined 40*s.* and costs; in default, one month's imprisonment.

NUISANCE FROM SMOKE.

AT Marlborough Street, Mr. Dickman, cabinet maker, of Fauconberg Place, St. Anne's, was summoned for having a furnace on his premises not constructed to consume its smoke. Mr. Sandison, C.E., Government officer, stated that the furnace on the defendant's premises was not properly constructed, and wa without any apparatus for preventing smoke. Constable Betteridge saw thick black smoke issuing from the defendant's premises on several occasions. The defendant was fined 5*l.*, and 1*l.* 8*s.* 3*d.* costs.

Mr. Wyeth, of London Street, was summoned for a similar offence. The police proved the case, but, Mr. Sandison having stated that what was required had been done, the fine was reduced to 20*s.* and 17*s.* 9*d.* costs.

IMPOVERISHING MILK.

AT Brentford Petty Sessions, J. Bodger, milkseller, Isleworth, was summoned for selling milk from which two-thirds of the fat had been abstracted. Mr. Gregg, the inspector, stopped the defendant as he was delivering milk from a cart, and demanded a pint from a large vessel. Defendant first requested him to go to his shop, and, on the inspector refusing to do so, he wished to supply him from a small can. The inspector, however, insisted on being supplied from the larger vessel, and on obtaining the milk sent his wife with a portion of it to Dr. Redwood, the analyst. Dr. Redwood stated that there were indications of the milk having been of good quality. Skimmed milk would contain about the same proportion of fat. He thought the public had a right to expect pure milk for 5*d.* per quart, the price paid in this instance. The magistrates imposed a fine of 5*l.* with 2*l.* 2*s.* costs.

PUTRID CAULIFLOWERS.

MR. J. PAYNE, one of the sanitary inspectors for the City, asked Sir. W. Rose to condemn a quantity of cauliflowers which had been sold by a salesman in the Farringdon Market to a costermonger, and had been seized as unfit for human food. The inspector stated that that morning the beadle of the market brought the cauliflowers to him and he seized them. Sir W. Rose said he had seen the vegetables, and had no hesitation in condemning them. He directed the matter to be laid before the Commissioners of Sewers, that their instructions might be taken. The costermonger asked what remedy he had. He bought eight cases of cauliflowers from Mr. Starling for 1*l.*, and found they were bad. He went to Mr. Starling and told him the condition they were in. Mr. Starling ordered him to be off, or he would have him locked up. Sir W. Rose said he had condmned them as unfit for human food, and that was all he could do at present. The applicant would have his remedy in the City of London Court.

METROPOLITAN CHURCHYARDS.

AT the Consistorial Court of London, before Dr. Tristram, the Chancellor of the Diocese, a question of some importance was mentioned, as to the appropriation of disused churchyards. The rector, the Rev. S. Hansard, and the churchwardens of St. Matthew, Bethnal Green, had petitioned for a faculty to erect in the churchyard a mortuary and rooms for *post-mortem* examinations, as also for a Coroner's Court. Objection had been made on the part of inhabitants. Mr. Pritchard appeared for the petitioners, and Mr. Moore on the part of the objectors. It was stated that the proceedings were closed, and the parties wished to know whether the Court could proceed on affidavits and require witnesses to attend for cross-examination, or whether the case would be heard on *vivâ voce* evidence. There were some 20 witnesses to be called, and probably the case would occupy a couple of days. The Chancellor remarked that the question raised was an important one, and he would appoint the hearing before Christmas on *vivâ voce* evidence.

BREACH OF BY-LAWS.

C. KELLERD, builder, of 40, Shirland Road, Paddington, appeared to answer two summonses taken out by the Willesden Local Board, the first for that he began to build houses in Cambridge Road, Kilburn, without submitting plans and sections to the board, as required by the by-laws, and section 154 of the Public Health Act, 1875. The second was for causing and permitting a certain quantity of clay, mixed with other material, to be in a state of combustion, the same being a nuisance and injurious to health. In the first summons the defendant pleaded guilty, and it was stated that plans similar to those received by other parishes were sent to the board, but they were not in compliance with the requirements of the by-laws. Proper plans had since been supplied. The clerk said the defendant had been cautioned several times, but he had set the board at defiance. In the second case it was proved that the defendant is erecting houses at the back of Atkinson Terrace, and for the last three weeks had been burning clay and refuse within thirty yards of the houses, causing such a nuisance, through the stench and the smoke, that the windows at the back could not be opened. Mr. Cooke made an order on the defendant to abate the nuisance and for discontinuance of it, and pay 5*l.* 5*s.* costs. In the first case he would have to pay 40*s.* and costs.

OVERCROWDING: A DOUBTFUL DECISION.

AT Hammersmith, R. Polding, of Brentford, was summoned at the instance of the Sanitary Authority of Chiswick for causing a nuisance in the house by overcrowding. The clerk said the proceedings had been taken to prevent the outbreak of an epidemic. There were eight children with the parents living in the place, with only 1,000 cubic feet of air. The defendant did not appear, but he was represented by his wife, a stout, robust little woman. Mr. Moore, the medical officer, said there were only two habitable rooms in the house. All the family slept in one. The wife said, not now. She could not get another house as she had so many children. What could she do with the children? If they were turned out, they would have to go to the workhouse. Mr. Finnis said the sanitary authority had done their duty, and were content to leave the case in his hands. Mr. Bridge said epidemics arose, as he understood, through the *physique* of persons being lowered by sleeping in crowded places, but in this case the parties were all healthy, and not predisposed to disease. He dismissed the summons.

AN ARGUMENTATIVE PERSON.

R. TAYLOR, 4, Sebbon Street, was summoned by the parish of St. Mary, Islington, for not obeying an order to vaccinate two children. The vaccination-officer stated that he went to the defendant's house on the 30th ult, and saw the servant, who went to her mistress, and was told to tell him that the children had not been vaccinated. Mr. Barstow ruled that that was only a hearsay statement, and was not evidence of the children not having been vaccinated. This difficulty having been overcome, the defendant argued that he could only be fined once for one offence. He had already been fined twice for this one offence. He wished to ask whether the Act was intended to prevent small-pox. Mr. Barstow: You might just as well ask whether an Act for the prevention of felony does not prevent felony. The defendant: In that case you do not convict a man three times for one felony. He has to commit three to be convicted three times. The defendant then went on to read a long statement but was stopped by the magistrate who fined the defendant 20*s.* in each case and costs. The defendant: That is the third time for one offence, sir.

SALTING BEER.

JOHN BURY, landlord of the Old House, William Street, was summoned for selling adulterated beer. Mr. C. Fryer, the Town Clerk, on behalf of the Corporation, in opening the proceedings, stated that the defendant had in a gallon of beer put 137 grains of salt, whereas they were only allowed 50 grains. Under the Licensing Act, 1872, no salt whatever is allowed to be put in, but that had since been repealed. It then became known that beer could not be made without salt being put in. He read a communication from the Inland Revenue Department, which stated that they did not interfere with salt being put in beer unless it exceeded 50 grains in a gallon. Drink with the quantity of salt in like it was in the present case was worse for the person who drank it, but better for the one who sold it. The certificate from Dr. Brown stated that there were 137 grains of salt per gallon in the beer, which was much more than was required. Sixty or even seventy grains were allowed, but it was unnecessary to have more than 20. The Mayor said that as it was the first case in the borough, defendant would only be fined 20*s.* and costs; in default, fourteen days: but any future cases might be dealt with more severely.

HOW SCARLET FEVER IS SPREAD.

AT the Bradford Borough Court, the town clerk conducted a prosecution against M. A. Barry, for removing a child infected with scarlet fever, the child's skin being in the peeling state, when the disease is most infectious. J. Winder, the woman who had carried the child, was also summoned. The town clerk having called attention to the risk of contagion that had arisen from the defendant's conduct, and stated that he appeared in the interests of the public, called the medical officer, who proved that he called on Mrs. Barry, found one child, three years old, suffering from scarlet fever, the child's skin being in the peeling state, which was most dangerous. He advised that the child should be sent to the Fever Hospital, where it would have every care and attention, and made arrangements for the removal, but when he went again the child had not been sent to the hospital. It had been taken away to another house, where there were no means of isolation. The mayor said it was necessary to protect the public that the parties should be fined, and in any other cases the full penalty would be inflicted. Both the defendants would be fined 40*s.*, with 8*s.* costs, or one month in default.

MILK ADULTERATIONS.

THREE prosecutions for selling adulterated milk have been brought before the Brentford magistrates. The first case was that of John Adams, farmer and milk contractor, Southall, who supplied milk to the St. Marylebone parochial schools. Of two samples of milk obtained from the defendant's cart, one was certified by Dr. Redwood to contain 19 per cent. of added water, and the other 16 per cent. Mr. John Paton, superintendent of the schools, stated that the defendant had held the contract for the milk supply for four or five years. The consumption amounted to about 160 gallons per week, and the defendant's account reached the large sum of 900*l.* or 1,000*l.* per year. By the terms of his contract he was bound to supply 'good, genuine. unadulterated, new milk from the cow,' and the witness had written to him two or three times calling his attention to the quality. The chairman (Mr. Glossop) said the case was a bad one, because the milk was intended for children, many of whom were weakly and scrofulous, and to whom a good milk diet was essential. Therefore this adulteration was very wicked, and the magistrates had decided to impose a fine of 20*l.* and 2*l.* costs. Edwin Thomas Barnett and Henry Wood, also living at Southall, were each fined 40*s.* and 20*s.* costs for respectively selling milk adulterated to the extent of 22 and 20 per cent.

BRIEF NOTES OF CASES.

LANDS CLAUSES ACT.

1877. *Hooper* v. *Bourne.*—Lands Clauses Act, 1845, § 127. Superfluous lands. Progressive increase in the traffic of a railway, such as to render it probable that the whole of the surplus land would at no distant period be required for the purposes of the undertaking. Held, on the evidence, that the adjoining owners were not entitled to recover possession of their land. *G. W. R.* v. *May* distinguished. (46 L.J., Q.B., 509; L.R., 2 Q.B.D., 339; 37 L.T., 97; 41 J.P., 725.

SMOKE NUISANCE.

1847. *Rich* v. *Basterfield.*—Nuisance from smoke emanating from a chimney. Action against landlord on the ground that as he built the chimney and let the premises with the chimney which caused the nuisance, he was liable. Action held not maintainable. (16 L.J., C.P., 273; 4 C.B., 783.)

SEWER.

1877. *Barrow* v. *Yorkshire*, W. R. J. J.—Public Health Act, 1875, §§ 94–6 and 255. Dispute between an owner and a tenant as to the right to use a private sewer. An existing connection cut by former. Stoppage of the sewage, and a nuisance the result. Order for abatement of the nuisance by renewing the connection held good. (41 J.P., 716.)

WATER RIGHTS.

1866. *Bickett* v. *Morris.*—Though a riparian owner is the owner in severalty of half the *alveus*, he has no right to build upon such *alveus*, even though damage is occasioned thereby. (L.R. 1 H.L. 47 Sc. App.; 14 L.T., 835.)

Legal Notes and Queries.

'SHAM VACCINATION.'

'J. B. S.' writes to the *Times*: 'Admitting that "sham vaccination" may at times be performed by quacks, your correspondent, Dr. Hamilton, is wrong in assuming that medical certificates of successful vaccination, signed by charlatans, are ever accepted as proof of vaccination. No vaccination officer is authorised to received a certificate but from a legally-qualified practitioner. If vaccination is performed by a midwife, chemist, or other unqualified medical practitioner, the certificate of vaccination given will not protect the parents of children who knowingly obtain such certificates from being liable to prosecution. Moreover, every person who wilfully signs a false certificate shall, according to the Act 34 and 35 Vic., cap. 98, be guilty of a misdemeanour, and be liable to fine or to imprisonment, with or without hard labour, for a period not exceeding two years.'

JURISDICTION OF JUSTICES.

AT the Selby Petty Sessions, on October 28, before two justices for the West Riding, the Selby Local Board of Health were summoned by the Selby Rural Sanitary Authority, under section 48 of the Public Health Act, 1875, which enacts that 'where any watercourse or open ditch lying near to or forming the boundary between the district of any local authority and any *adjoining district* is foul and offensive, so as injuriously to affect the district of such local authority, any justice having jurisdiction in such *adjoining district* may, on the application of such local authority, summon the local authority of such *adjoining district* to appear before a court of summary jurisdiction to show cause why an order should not be made by such court for cleansing such watercourse or open ditch, and for executing such permanent and structural works as may appear to such court to be necessary,' etc. It appeared that on the boundary between the urban district of Selby in the West Riding, and the township of Barlby in the East Riding, and in the district of the Selby Rural Sanitary Authority, there was an open watercourse, the Holme Dyke. The boundary ran along the Selby side of the watercourse, so that the watercourse itself lay wholly in the district of the rural authority and in the East Riding. This watercourse had been for a long time foul and offensive in consequence of the Selby Local Board having constructed a sewer which discharged the sewage of a large part of the town into it. The Selby Rural Authority proposed to cleanse and cover this watercourse, but the Selby Local Board refused to bear any portion of the expense of so doing. Hence the application. At the outset, Mr. R. J. Parker, for the local board, took objection to the summons, which had been signed by a justice for the West Riding, on the ground of want of jurisdiction. He held that as the Holme Dyke lay wholly in the East Riding, the case should have been brought before the East Riding justices. For the rural authority, Mr. Law contended that the words 'adjoining district' in the Act applied to the Selby Urban District, and that therefore the West Riding justices had jurisdiction. The bench decided that they had no jurisdiction, and dismissed the summons. Query.—Was not this decision of the justices contrary to law?

[No; it seems to us that as the nuisance lay in the East Riding, and the prosecutors were an East Riding authority, therefore the case should have been heard by East Riding justices.]

DR. GRANGER, the medical officer of health for the Cardiff rural sanitary district, at the last meeting of the authority, reported the death of a woman in the parish of Llancarvan, at the age of 105.

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

TYPHOID FEVER AT ACCRINGTON.

(*To the Editor of the* SANITARY RECORD.)

SIR,—I forward you copy of the *Accrington Times*, in which you will find a report of proceedings at the last meeting of our local board, and will notice that you have 'raised a scare,' which is, to say the least, unpleasant. We have no special love for men of science, possessing at once a sense of public duty and brains in proportion, therefore, mysterious stranger! you may well imagine how unwelcome your visit has been. Misguided physicist! Why should you harass us with visions of 'glass bottles holding about two quarts,' when you ought to know that stoneware is *de rigueur*, and we 'have been told' that 'about a gallon' is the only accurate unit? Why torture us with your unknown quantities in hieroglyphic decimals, with albuminoid abstractions, and analytic infinitesmals, when even royalty has been touched with typhoid, and by 'letting things be' we are doing our best to find a home for royalty's guest? Had you but given due notice of your advent you might have been found in that 'conveyance' to the gathering ground of the famous water-party at Mitchell's, where the directors were so 'very kind' and the water so 'very good and very satisfactory.' Having 'inspected' three out of the six possible sources of pollution you might then have assisted at that aqueous symposium, that 'good tea' in good company. True, you might have felt that you had been pleasantly 'done,' but your sting had then lost its venom, and the hide of the pachyderm had remained unscathed. You will scarcely thank me to tell you of all the physical and intellectual delights which you have missed, but which you must feel deeply. I have just further to tell you plainly that we don't want any meddlers here. We know what we do want, and sanitary science is no part of it. If anyone would upset or modify our settled convictions, we ask each other in that polished dialect which we best understand, 'Wod hez he getten to do wee't?'

Look, for example, at our medical officer. In his monthly reports he from time to time makes disagreeable statements. They may be true; still, they are disagreeable. But one of us has *him* well in hand, and we think we shall be able to 'do' for him. His time is up, and in future we must have the 'sole control' of all officers, especially 'doctors.' Their only object is to 'raise their wages.' They are no use here, and since we are compelled to obey the law, in form at least, one man is as good as another, *if not better*. So, as you will see, we have advertised the 'shop,' and expect a precious scramble for it. And some of us would fain hope that the profession will be loyal to itself, and for once make an example.

Accrington, AQUAREGIA.
November 12, 1877.

THE WATER-SUPPLY OF NEWHAVEN.

(*To the Editor of the* SANITARY RECORD.)

SIR,—All sanitarians are necessarily much interested in the reputation of your journal; consequently when I see mistaken allusions—relating to water-supply—to places with which I am well acquainted, I trust you will permit me to make a few remarks.

For some time I have urged the desirability of a 'good supply of water for Newhaven.' I was surprised therefore to read in the SANITARY RECORD, September 28—'The town has a population of about 3,000, and the water company furnish a constant supply of water derived from wells. The supply is always available for fire!' Such good

news however proved to be incorrect. The error arose from a laxity in the mode of seeking for scientific information, as well as in the arrangement for collecting the samples of water. The constant supply alluded to is merely provided for the railway company and a few houses adjacent. Speaking of this water, Professor Wigner in his last communication does not say whether his assistant obtained the sample from a tap or from a cistern. Mr. Hobbs's well is out of the town, away from drains and cesspools : its water was analysed, for public purposes, about three years ago, and found to be of a good drinking quality.

I assumed that the reports on water-supply in your journal were intended to act as guides to the visitors of sea-side places ; I was therefore surprised to find that the sample of water from Seaford had been taken from a private dwelling, and before it was forwarded to the analyst had been passed through a new filter. The water supplied from a tank, erected by the late Dr. Tyler Smith, to a few of the principal lodging-houses was not analysed, though Professor Wigner's last communication showed how necessary it was that this should be examined. I must add that, during the four years I have had sanitary supervision of Seaford, I have known but one case of fever (scarlatina, imported) in these ten or twelve houses, though I am kindly informed of all cases of infectious diseases in that town.

As to the closing of a well, except in urgent cases, I never attempt to do so until the inspector has failed in detecting the source of its impurity. In many parts of my district water is scarce, and the closing of a well is thus no light matter.

As to my 'refusal to forward samples,' you may remember perhaps that when you asked me about two years ago to fill in 'tables of mortality and sickness' touching seaside places, I gave to you then the same answer as I have done to Professor Wigner, namely, that I could not do so without the consent of my authorities. In the south, we—whilst carrying out our manifold duties, I hope efficiently—cannot forget that of our own free will we are servants of 'sanitary boards,' and as long as we remain so are bound to pay them deference.

A few grey hairs warn me of a slow but sure degeneracy ; but notwithstanding my bodily, and perhaps mental, failings, the bracing air of the Southdowns has hitherto warded off a bilious temperament, and its frequent companion—asceticism. I can still enjoy a little jocularity with genial friends. Our risible faculties were excited, not by the 'impurity of the well,' but by the ingenuity of a wily tactician, and by the announcement in a public journal of 'constant water-supply,' which had no foundation in fact.

We are indebted to Professor Wigner for his elaborate analyses, and had he not neglected the old adage, 'If you want anything done you must do it yourself,' and collected all his samples by his assistant, as he is doing now, no errors could possibly have arisen. E. F. FUSSELL,

Medical Officer of Health of Eastern Sussex.

November 15, 1877.

MR. WIGNER'S WATER ANALYSES.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Permit me, through the SANITARY RECORD, to ask Mr. Wigner a few questions, as well as to make a few running comments on his processes and conclusions ?

(1) Is it quite correct to add together nitrogen as ammonia, nitrogen as albuminoid ammonia, nitrogen as nitrates, and nitrogen as nitrites ; and has the double distillation no effect on the nitrogen in either or both the two last compounds ? if it has, then Mr. Wigner has estimated the total nitrogen in all his samples at too high a figure.

(2) Why does not Mr. Wigner take notice of and estimate all the excremental products usually present in contaminated water ?

(3) How has Mr. Wigner so cultivated his sense of smell as to diagnose the source of contamination, rotten leaves etc., in so many instances ?

(4) Mr. Wigner is evidently opposed not only to Dr. Parsons as to urea but also to Professor Wanklyn, Mr. Francis, and Dr. Cornelius Fox. Mr. Wigner may be right, but if so the above gentlemen and their disciples have been underestimating water impurities. Or perhaps Mr. Wigner has not studied Professor Wanklyn's works aright.

(5) Would not a set of numbered glass colour discs or a graduated glass colour scale, as suggested by Mr. Jackson, be simpler than the Colorimeter, which after all is hardly as a time-saver at least, any improvement on ordinary test Nesslerising ?

While some of us may wish to learn from, and some of us to teach, Mr. Wigner, one and all must thank him for his bold and fearless crusade against filthy, *i.e.*, dangerous waters. All some of us fear is that his processes are a little too much involved and his conclusions a little incorrect. ARISTON MEN UDOR.

INSPECTORS OF NUISANCES.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Having held for some years the office of medical officer of health to a combined district, I have had some little experience of inspectors. Personally I have always been on the best of terms with those with whom I have been associated, and have no reason to complain of any want of deference on their part towards myself. I have, in fact, but one complaint to make against them, namely, that they do not inspect nuisances. That part of their duty being disagreeable and tending to procure for them the ill will of influential neighbours, they are fain to leave it to the medical officer. One is 'collector and inspector,' others 'surveyor and inspector,' and what with the collecting of rates, the care of roads and water works, the superintendence of the scavenging, and the drawing of abortive plans for sewerage, they plead that they have no time left for looking after nuisances, or serving and following up notices. The consequence is that but little is done in the way of the abatement of nuisances, and that little, mostly upon my representations, for as the inspectors are responsible to the sanitary authorities and not to me, I have no other way of getting the work done. It matters very little, I take it, by what title inspectors of nuisances are called, so long as they do their work, but I fear that in some cases the objection to the official designation is based less upon grounds of euphony than upon a distaste for the duties which that designation implies.

The motto of the inspector, and indeed of all sanitary officers, should be *Suaviter in modo, fortiter in re.* The work of an inspector faithfully performed can hardly fail to arouse opposition ; and whether his duty be to invade the privacy of an Englishman's castle, or to touch him in that most tender spot, the breeches pocket, all possible urbanity and tact are needed to sugar the pill. A blustering and overbearing manner, such as is sometimes found together with many good qualities, in men who have served in the police force, tends to 'set people's backs up' and to hinder sanitary progress. On the other hand, indecision and easy-going complaisance are faults quite as prejudicial to the usefulness of an inspector ; nothing but firmness and perseverance will avail to get improvements carried out by temporising landlords, scamping workmen, and nonchalant sanitary authorities ; indeed, of the two an accommodating laxity is the more dangerous fault, since it is more likely even than a faithful discharge of duty, to procure popularity and an increase of salary.

While approving of examinations for inspectors of nuisances, I consider that they should be to a large extent practical ; that conducted by the Sanitary Institute appeared to me from the syllabus too theoretical. It seems to me that a practical knowledge of dyking, bricklaying and plumbing is of more value to an inspector than to be able to say how much carbonic acid an average man will exhale in an hour. On such points he can fall back upon

the opinion of the medical officer, but with regard to practical matters he will often have to hold his own unaided against the interested asseverations of other parties. At the Cambridge examination in sanitary science, practical tests form a large part of the examination, and candidates are sent, notebook in hand, to different parts of the town to inspect and draw up reports. Could not similar tests be applied in the case of inspectors of nuisances? S. S. C.

November 13, 1877.

DISINFECTION AT LAUNDRIES.

(*To the Editor of the* SANITARY RECORD.)

SIR,—In a recent number of the SANITARY RECORD (November 2), you refer to the establishment of the New Parisienne Laundry Company. As it is mainly on public grounds that it has been promoted, I trust you will allow me, as a medical officer of health, to make an observation on the question of sending infected clothing, etc., to laundries, or, in other words, the establishment of unauthorised disinfecting stations.

I cannot but think myself, and there are many others I know of the same opinion, that disinfection at laundries is wrong in principle, and that the practice of sending linen and other garments in an infected state to the same places where non-infected goods are received for washing, if extensively adopted, would, so far from obviating the dangers at present existing, tend rather to increase them.

The law prohibits the transmission of infected articles except under proper precautions and for the purposes of disinfection. Surely the 126th section of the Public Health Act should be taken to mean that infected things must not be sent from place to place unless it be for the purposes of disinfection by the proper authority, or at least by authorised persons.

The precautions for the removal of infected things, and for keeping them entirely apart from others (involving as it does the maintenance of a separate staff for the purpose), may in the case of this particular company be sufficient; the process to which the goods are to be subjected, though not specified in the article referred to, may be of such a kind as can be safely relied on for destroying the infection of such diseases as scarlet fever and small-pox. But in other cases it will not be so; and in a matter that affects the public, it may be fairly argued that there would be considerable risk in leaving these precautionary measures to be determined on by the *employés* of competing companies.

The sanitary authorities, who are the proper persons to carry out the processes of disinfection, provide the means and also safe methods for transmitting infected things, and it is to be feared that the new proposal will tend to create obstacles in the way of their performing this duty. On the other hand, it is difficult to see how it can be anything but a disadvantage to the company itself, as the public would surely have more confidence in an establishment where every effort was made for the exclusion of infected things not previously disinfected. EDWARD SEATON.

Nottingham, November 17, 1877.

VENTILATING COWLS.

(*To the Editor of the* SANITARY RECORD.)

SIR,—An article published in yours of November 9, by Mr. Ernest Turner, makes reference to a number of 'Ventilating Cowls,' with a recommendation in favour of that of Messrs. Boyle's.

Knowing that the author has considerable experience in such matters, I shall feel greatly obliged for an explanation from him as to the difference in principle of motion between that of Messrs. Boyle's and that of Kite's angular ventilator, a diagram of which appears in folio 121 of a book termed 'Sanitary Science,' by R. Scott Burn, published by W. Collins and Sons, London.

J. DOBSON, S.I.

1 Montrose Street, Glasgow,

Review.

The Antiseptic Treatment of Zymotic Diseases. A Paper read before the Hunts Medical Society by Dr. E. J. SYSON, Medical Officer of Health.

THIS is a paper which is well worth perusal. The position from which its author starts is that whatever theory we may adopt as to the nature of infectious fevers, whether we assume them to be due to the introduction into the body of living germinal elements, which by their multiplication therein produce the diseased condition, or of dead matter, which by its chemical action on the humours of the body sets up a process analogous to fermentation, in either case the object of the physician should be to endeavour to arrest the progress of the disturbance by the use of agents which exercise a special influence in this direction. His lecture might, indeed, have been appropriately entitled 'A Plea for the Use of Specifics in the Treatment of Infectious Disease.' To the question which he asks at the outset—Ought not septic diseases to be treated in an antiseptic manner?—there can, we apprehend, be but one reply, though it is somewhat strange that this view of it should have attracted hitherto so little attention. Still, the idea itself is not altogether a new one, the sulphites having been suggested some years ago by Professor Polli of Milan* and others as specifics for some forms of zymotic disease, and, more recently still, salicylic acid, carbolic acid, and terebene having been employed with more or less success in the same direction.

Whilst, however, the internal use of antiseptics in the treatment of septic forms of disease is not so new as Dr. Syson seems to think, we consider that he has done good service in urging a more extended trial for them by the profession than they have hitherto received, and in protesting against the assumption of the expectant view which now so generally prevails in regard to these diseases. It is, as he justly remarks, a reproach to medical science that diseases which are so commonly spoken of as preventable with reference to the causes by which they are produced, should be so universally regarded as incurable, that the practitioner who is called on to treat them contents himself, as a rule, with doing next to nothing, simply watching the efforts of nature, in the belief that the disease must run its regular course, and that no efforts of his can abbreviate it. Possibly, however, this *laissez aller* policy is due in most cases rather to the imperfect state of our knowledge as to the effects of recognised antiseptic agents when administered internally, than to any want of recognition of the desirability of using such agents if they were available. The whole subject of infectious disease is at present in such an obscure condition that anything like a rational system of therapeutics in regard to it has yet to be elaborated. What is wanted is careful and extended experiment on the action of the various antiseptic agents with which science has already provided us when administered internally in the healthy body and in those forms of disease which possess the power of reproducing themselves by transmission from one animal to another.

It is here that Dr. Syson offers us a suggestion of an eminently practical nature, founded upon his own observation. He was led in the year 1866 by some facts which came under his notice to infer that it was impossible to vaccinate successfully a patient who was at the time under the medicinal influence of arsenic; and he then determined to ascertain whether the administration of this drug would exercise any antagonistic influence on small-pox. In three cases in which he applied it he states that the results quite confirmed his anticipations. These cases Dr. Syson admits are not sufficient by themselves to do more than give arsenic a claim to a larger trial than he has been able to obtain

* In a paper read before the British Medical Association in 1867.

for it. But he is able to give confirmatory evidence from another quarter of its value as an internal antiseptic. When the rinderpest visited his neighbourhood, he, in conjunction with Mr. Stone, the Cattle Plague Inspector for the Doncaster district, treated a large number of cases with arsenic, and he states that he knows of no others which recovered, with one exception, but these. The exceptional case was treated with large doses of common salt. On these facts, which are certainly very striking, Dr. Syson claims for arsenic a larger trial as an antiseptic in infectious disease generally, and we trust that it will not be long before we shall hear that his suggestion has been tested. Arsenic has been long known to possess very powerful antiseptic properties, and also to exercise a specific influence on various forms of periodic affection which border closely on infectious disease. Irrespective, therefore of the evidence of actual experience which Dr. Syson is able to adduce in its favour, there are in these facts alone strong *primâ facie* grounds for giving it a trial. Should the result corroborate the belief in its efficacy which Dr. Syson has formed, he will have laid humanity under an obligation to him, little if at all inferior to that which it owes to Jenner for the introduction of vaccination.

Notices of Meetings.

STRAND BOARD OF WORKS.

WE note the following resolution. Dr. Rogers has placed a notice of motion for November 28, to the following effect: 'That it be an instruction to the inspector of nuisances that he do put himself in communication weekly with the relieving officers of the district, for the purpose of ascertaining whether he has removed to the workhouse any person in a filthy or unsanitary condition, and if so, from whence; and also for the purpose of ascertaining whether any pauper in the receipt of out-door relief is living in a filthy or unsanitary condition.'

THE NATIONAL HEALTH SOCIETY.

THE National Health Society has organised a very efficient staff of lecturers who are prepared to give courses of lectures on the laws of health as applied to domestic management, the management of infants, the prevention of infectious diseases, and allied subjects; also on elementary physiology. The society is now giving courses of lectures by Dr. Pope, on food, drinks, and the actions of alcohol, at the Mission Hall, Great Ormond Street; by Miss Downing, in Whitechapel, Stepney, and East Moulsey, on 'Fresh Air,' 'The Skin,' and 'How to Manage a Baby.' The National Health Society would be glad of further applications from societies, clergymen, etc., for lectures on the subjects mentioned.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

ASHENDEN, Charles, M.R.C.S. Eng., L.S.A. Lond., has been reappointed Medical Officer of Health for the Hastings Urban Sanitary District at 150*l.* for one year, and Public Analyst at 50*l.* per ann.

BOOCOCK, Mr. William Henry, has been appointed Clerk to the Luddenden-Foot Local Board and Urban Sanitary Authority, Yorkshire, vice Dearden, deceased, at 10*l.* per ann.

BOOTH, Mr. William, has been appointed Surveyor and Inspector of Nuisances to the Luddenden-Foot Local Board and Urban Sanitary Authority, vice Nicholl, resigned, at 78*l.* per ann.

BROGDEN, J. G., Esq., has been appointed Chairman of the Grange Local Board and Urban Sanitary Authority, Lancashire, vice Gregson, resigned.

BROWN, John, L.R.C.P. Lond., has been appointed Medical Officer of Health for the Bacup Urban Sanitary District, vice Worrall, resigned, at 100*l.* for one year.

DRAKE, Mr. Francis, has been appointed Surveyor and Inspector of Nuisances to the South Stockton Local Board and Urban Sanitary Authority, Yorkshire, vice Hall, appointed Surveyor to the Corporation and Urban Sanitary Authority of Stockton-on-Tees, at 200*l.* per ann.

FIRTH, Mr. John, has been reappointed Inspector of Nuisances for the North Bierley Urban Sanitary District at 30*l.* for one year.

GUTTERIDGE, Edwin Parker, M.R.C.S. Eng. and L.M., L.S.A. Lond., has been reappointed Medical Officer of Health for the Maldon Port Sanitary District, at 10*l.* 10*s.* for one year.

HAIGH, Mr. Francis, has been reappointed Inspector of Nuisances for the Abergavenny Urban Sanitary District for one year.

KENYON, Dr. George Arthur, has been reappointed Medical Officer of Health for the Chester Urban Sanitary District, at 240*l.* per ann. for three years.

MACNAB, Mr. Angus, has been reappointed Inspector of Nuisances for the Maldon Port Sanitary District, at 24*l.* for one year.

OSBORNE, Mr. Joseph, has been appointed Inspector of Nuisances for the Carlisle Urban Sanitary District, vice Robinson, appointed to Aston Manor, at 100*l.* per ann.

SHERATON, George Robert, L.R.C.P. Edin., M.R.C.S. Eng., has been appointed Medical Officer of Health for the Sedgefield Rural Sanitary District, vice the District Medical Officers.

STEEL, Samuel Hopkins, M.B. Univ. Lond., M.R.C.S. Eng., has been reappointed Medical Officer of Health for the Abergavenny Urban Sanitary District at 60*l.* for one year.

VACANCIES.

ATCHAM RURAL SANITARY DISTRICT, Suffolk. Inspector of Nuisances.

ALTOFTS LOCAL BOARD AND URBAN SANITARY AUTHORITY, Yorkshire. Clerk, Inspector of Nuisances, Collector, etc.: 100*l.* per ann. and residence.

ALTRINCHAM, CONGLETON, AND NANTWICH RURAL, AND LYNN, MIDDLEWICH, SANDBACH, AND WINSFORD URBAN SANITARY DISTRICTS. Medical Officer of Health: 800*l.* per ann. for three years.

BECCLES, CORPORATION OF, AND URBAN SANITARY AUTHORITY. Surveyor.

CANTERBURY URBAN SANITARY DISTRICT. Medical Officer of Health.

CRANBROOK GUARDIANS AND RURAL SANITARY AUTHORITY, etc., Kent. Clerk: 90*l.* per ann. as Clerk to the Guardians, and separate remuneration as Clerk to the Rural Sanitary Authority, Clerk to the Assessment Committee, and Clerk to the School Attendance Committee, and fees as Superintendent Registrar. Application, 28th instant, to A. R. Wood, Clerk *pro tem.*

LYDNEY, Gloucestershire. Certifying Factory Surgeon.

MUCH WENLOCK LOCAL BOARD AND URBAN SANITARY AUTHORITY, Salop. Clerk.

RADCLIFFE LOCAL BOARD AND URBAN SANITARY AUTHORITY, Lancashire. Clerk and Collector: 130*l.* per ann. Application, 28th instant, to R. H. Kaye, Esq., Chairman.

SANITARY PATENTS.

816. Tonic extract of meat. F. Anderson and J. Yair.
This is to prevent the precipitation in the tonic preparation made according to No. 2799 of 1874. The bulk of the tannin in red wine (which causes precipitation) is previously precipitated by any known means. The amount of spirit in Spanish red wines is also reduced, as excess of spirits has a tendency to precipitate the meat. Sherry or other white wine or British wine, with about 22 to 27 per cent. over-proof spirit, may be used instead of the Spanish red wines. If desirable, spirit may be added after blending the meat.

870. Extracting foul air from mines. J. Edwards.
At the top or bottom of the shaft is fixed a steam engine which works a fan or exhaust pump, connected with the workings by branched tubes. Another fan (with tubes, etc.) may be used to force pure air into the workings.

835. Treating sewage, etc. G. Alsing.
This relates to an arrangement of tanks, reservoirs, etc., for separating aqueous from solid matter; the solid matter is dried in a hot wind oven, then charged with combustible material and oils.

923. Chimney caps and ventilators. C. J. Gibson.
The main portion of the cap is formed of a series of spiral blades, like a many-bladed screw, the blades connected together at their peripheries by concave uprights made to catch the wind and rotate the cap. A vertical axis, with cross bar, is surmounted by a hollow cone or a cylinder.

976. Traps for sewer gas. J. C. Schofield.
In the (circular) 'well' or gulley is a 'pan' in form of a n inverted cone, with flange above resting on a ring of india-rubber, and having a gas-tight flap door below closed (after entrance of water to the gulley) by a counterbalanced lever or a spring.

NOTICE.

THE SANITARY RECORD *is published every Friday morning, and may be ordered direct from the Publishers. Annual Subscription, 17s. 4d.; free by post, 19s. 6d.*

Reading Covers to hold 12 numbers of THE SANITARY RECORD *have been prepared, and may be had direct from the Publishers or through any Bookseller, price 3s.*

Original Papers.

ON THE WATER-SUPPLY OF SEASIDE WATERING-PLACES.

BY G. W. WIGNER, F.C.S.

(*Continued from p.* 327.)

ST. IVES on the Cornish coast has a population of some 7,000, and, as far as I can judge, a very small proportion of visitors. The supply appears to be of a somewhat peculiar character; there appears to be two different reservoirs for the public supply, one called the Terrace Tank and the other the Backtallant Tank, and there is also another public supply known as 'The Fountain,' drawn from a spring in the rock and conveyed through pipes to many houses in the town. I could not get a sample from the Backtallant Tank as it was reported that an accident had taken place and the water was obliged to be shut off. My assistant obtained a sample from the Terrace Tank and the results were as follows:—

	Grains per gallon.
Total solid matter	12·80
Loss on ignition after deducting combined carbonic acid	2·38
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	4·80
Hardness before boiling, 4·7° (Clark's scale)	
,, after boiling, 4·2° ,, ,,	
Nitrogen as ammonia	0·0023
,, albuminoid ammonia	0·0050
,, nitrates	0·2240
,, nitrites	traces
Total nitrogen in these four forms	0·2313
Oxygen absorbed by organic matter	0·0480

The water had a good pale blue colour and was free from smell, but there was a distinct taste of an unpleasant character. The results of the microscopical examination were quite satisfactory. The albuminoid ammonia was on the margin line between first and second class waters, but all the other results were so good that the water must certainly rank as first class.

I also had a sample from The Fountain which gave the following results:—

	Grains per gallon.
Total solid matter	13·70
Loss on ignition after deducting combined carbonic acid	3·30
Lead and copper—none.	
Iron—minute trace.	
Chlorine calculated as chloride of sodium	5·03
Hardness before boiling, 4·5° (Clark's scale)	
,, after boiling, 4·5° ,, ,,	
Nitrogen as ammonia	0·0025
,, albuminoid ammonia	0·0042
,, nitrates	0·1930
,, nitrites	0·0030
Total nitrogen in these four forms	0·2027
Oxygen absorbed by organic matter	0·0480

This sample was quite free from smell and taste, the colour was good and the microscopical examination gave perfectly satisfactory results; the albuminoid ammonia and nitrates are both slightly less than in the Terrace Tank sample. The hardness is almost identical and the increase of chlorine immaterial. This also is a thoroughly good water.

PENZANCE has a population of some 10,000 or 12,000, and only a moderate proportion of visitors. There is a constant public supply amounting to about 30 gallons per head, per day; this supply is derived from springs and rainfall, and is always available for fire, but unfortunately is not filtered. The water was analysed last year by Mr. J. H. Collins, of Truro, and the following was sent to me by the borough surveyor as a copy of his report. No. 1 sample is said to have been taken from the reservoir, and No. 2 from a main in the town:

I have analysed the two samples of water you sent me with the following results:

	No. 1.	No. 2.
Total solid residue in grains per gallon.	7·5	6·8

This solid residue consists of chloride of sodium, chiefly as might be expected from sources near the sea. There is also present a little carbonate of iron, and traces of carbonate of lime and sulphate of lime. In each there is a trace only of organic matter. I consider these waters to be of very good quality for drinking and all domestic purposes.

J. H. COLLINS,
Public Analyst for the County of Cornwall.

It is difficult to conceive on what ground Mr. Collins bases his conclusions; the determination of total solids scarcely seems likely to be any guide in the detection of a 'trace only of organic matter.' An analysis in which the nitrogenous constituents are not in any way reported ought in these days to be looked upon as so much waste paper.

There appear to be two different sources of supply in use, namely, springs and surface-water; and I am informed that many complaints have been made as to the character of the supply. My assistant, therefore, obtained three samples; the first was from what is called the larger reservoir, and was drawn from a main pipe in the mayor's house, and gave the following results:

	Grains per gallon.
Total solid matter	9·60
Loss on ignition after deducting combined carbonic acid	1·00
Lead and copper—none.	
Iron—trace.	
Chlorine calculated as chloride of sodium	4·68
Hardness before boiling, 1·9° (Clark's scale)	
,, after boiling, 1·9° ,, ,,	
Nitrogen as ammonia	0·0045
,, albuminoid ammonia	0·0043
,, nitrates	0·1820
,, nitrites	traces
Total nitrogen in these four forms	0·1908
Oxygen absorbed by organic matter	0·0560

One of the worst features in this water was its dark greenish-yellow colour, but it was free from smell. The microscopical examination disclosed the presence of vegetable matter, but no animal remains.

The next sample was drawn from what is called the Old Town Reservoir, which is, I suppose, smaller than the other reservoir. This sample gave the following results:

	Grains per gallon.
Total solid matter	11·80
Loss on ignition after deducting combined carbonic acid	0·61
Lead and copper—none.	
Iron—slight trace.	
Chlorine calculated as chloride of sodium	5·50
Hardness before boiling, 1·8° (Clark's scale)	
,, after boiling, 1·6° ,, ,,	
Nitrogen as ammonia	0·0032
,, albuminoid ammonia	0·0024

	Grains per gallon
Nitrogen as nitrates	0·3780
,, nitrites	traces
Total nitrogen in these four forms	0·3836
Oxygen absorbed by organic matter	0·0620

The colour of this water was markedly better than that of the previous one, and it was quite free from smell or taste. The microscopical appearance was as nearly as possible identical with that of the sample from the mayor's house.

In order to test the matter thoroughly, my assistant obtained a third sample from a druggist's shop in the town; he was not able to ascertain whether this supply came from the large or small reservoir or from a mixture of the two. The following are the results :—

	Grains per gallon
Total solid matter	10·20
Loss on ignition after deducting combined carbonic acid	3·40
Lead and copper—none.	
Iron—slight trace.	
Chlorine, calculated as chloride of sodium	4·57
Hardness before boiling, 1·7° (Clark's scale)	
,, after boiling, 1·7° ,, ,,	
Nitrogen as ammonia	0·0066
,, albuminoid ammonia	0·0062
,, nitrates	0·1820
,, nitrites	traces
Total nitrogen in these four forms	0·1948
Oxygen absorbed by organic matter	0·0520

The colour of this water resembled that from the large reservoir more than that from the smaller one, and the figures of the analysis generally bear out this. It is, however, to be noticed that there is a rather heavy increase in the albuminoid ammonia, which is now so high as to rank in Wanklyn's second class.

I think, however, that putting all the three analyses side by side it is impossible to come to any other conclusion than that when my samples were taken, viz., on Oct. 10, last, the water-supply of Penzance was so good that there was no foundation then for the complaints which are reported to have been made.

FALMOUTH has a population of only some 6,000. The water-supply is drawn mainly from a river and springs, and is pumped into service reservoirs for distribution. The authorities have not supplied me with official particulars as to the quantity and constancy or otherwise of the supply. I have analysed two samples, both of which were drawn by my assistant on Oct. 9, last. The first sample was taken from what was said to be a main tap, at the house of the manager of the waterworks, and gave the following results :

	Grains per gallon.
Total solid matter	7·70
Loss on ignition after deducting combined carbonic acid	3·20
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	3·28
Hardness before boiling, 1·6° (Clark's scale)	
,, after boiling, 1·6° ,, ,,	
Nitrogen as ammonia	0·0028
,, albuminoid ammonia	0·0052
,, nitrates	0·0390
,, nitrites	0·0030
Total nitrogen in these four forms	0·0500
Oxygen absorbed by organic matter	0·0980

This water had a dark urine yellow colour, and a most offensive smell and nauseous taste. The microscopical examination showed that although no living organisms could be detected, it contained more disintegrated and decomposing vegetable matter than any other water which I have up to the present time reported on round the coast. Despite the distinct statement to the contrary, I am inclined to think that this water had been stored in a cistern.

I also had a sample from an hotel in the town, and this was drawn within an hour of the other sample; it gave the following results :

	Grains per gallon.
Total solid matter	9·90
Loss on ignition after deducting combined carbonic acid	4·20
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	3·04
Hardness before boiling, 1·5° (Clark's scale)	
,, after boiling, 1·5° ,, ,,	
Nitrogen as ammonia.	0·0028
,, albuminoid ammonia	0·0066
,, nitrates	0·0240
,, nitrites	0·0040
Total nitrogen in these four forms	0·0374
Oxygen absorbed by organic matter	0·0940

The colour of this water was slightly yellow, but not nearly so bad as the previous one, and it was entirely free from the objectionable smell and taste referred to above. The residue and sedimentary matter, however, showed much vegetable contamination. It will be noticed, too, that there are certain differences in the chemical results of the two samples sufficient to render it probable that one sample had been stored and the other not.

DEVONPORT has a population of about 50,000. The supply is said to be derived from springs in the granite on Dartmoor, and is stored in a service reservoir. At present there are no arrangements for filtration, but it is hoped that some works for that purpose, which are in course of construction, will be completed by Midsummer next. I have had four samples from this town : one was drawn by my assistant from a main tap at the Water Company's Offices on October 9 last, and another sample was forwarded to me by the Surveyor on November 12, or one month later. I place the results side by side :

	Water Company's Offices. Grains per gallon.	Surveyor. Grains per gallon.
Total solid matter	2·80	4·00
Loss on ignition after deducting combined carbonic acid	0·35	1·50
Lead and copper	none	none
Iron	traces	traces
Chlorine calculated as chloride of sodium	1·52	1·52
Hardness before boiling, Water Company's Office, 0·9°; Surveyor, 0·9° (Clark's scale)		
Hardness after boiling, Water Company's Office, 0·9°; Surveyor, 0·9° (Clark's scale)		
Nitrogen as ammonia	0·0017	0·0045
,, albuminoid ammonia	0·0064	0·0041
,, nitrates	0·0390	0·0250
,, nitrites	0·0030	0·0030
Total nitrogen in these four forms	0·0501	0·0366
Oxygen absorbed by organic matter	0·0400	0·0860

Both these waters had a yellow tint, and both had a distinctly perceptible peaty taste, but they were free from smell. There is a considerable difference in the free and albuminoid ammonia between the two samples, and also in the volatile matter driven off on ignition. In both cases the microscope showed contamination of a peaty character. Except in this respect, and the taste which is also due to the same cause, the water might be passed as a good one.

On November 5 I received another sample from a resident in the town, and it gave the following results:

	Grains per gallon.
Total solid matter	4·10
Loss on ignition after deducting combined carbonic acid	1·40
Lead and copper—none.	
Iron—heavy traces.	
Chlorine calculated as chloride of sodium	1·41
Hardness before boiling, 1·1° (Clark's scale)	
,, after boiling, 1·1° ,, ,,	
Nitrogen as ammonia	0·0026
,, albuminoid ammonia	0·0048
,, nitrates	0·0140
,, nitrites	traces
Total nitrogen in these four forms	0·0214
Oxygen absorbed by organic matter	0·1880

It is especially to be noted in this case that although the albuminoid ammonia is not very different from what it is in the surveyor's sample of November 12, the oxygen absorbed was more than double, and the yellow tint of the water had correspondingly increased. The microscopical examination gave the same results as in the case of the other samples. It is clear therefore that the gathering ground of the Devonport water-supply is to some extent contaminated with peaty matter, and it appears that this washes down into the reservoirs in an uncertain and irregular manner, dependent perhaps upon the amount of the rainfall.

The fourth sample I obtained was drawn by one of my assistants at an hotel in the town, from what was alleged to be a main tap, but as I am not fully satisfied that it was a main tap I make no further reference to it.

PLYMOUTH has a population of some 80,000. I have not been able to obtain any official information as to the source from which the water is derived, and the other particulars of the supply. I am, however, unofficially informed that there have been many complaints as to the turbid character of the water, and although the total solids and nitrogenous constituents of my samples are extremely low, these complaints receive some verification from the fact that a sample drawn on October 9, in the centre of the town, contained a heavy quantity of suspended matter. My assistant obtained two samples, one being drawn from the drinking fountain in the wall of the South reservoir, and the other from a main tap at an inn close to the public offices. The following were the results:

	From Fountain. Grains per gallon.	From Inn. Grains per gallon.
Total solid matter	2·80	2·76
Loss on ignition after deducting combined carbonic acid	0·40	0·34
Lead and copper—none.		
Iron—traces.		
Chlorine calculated as chloride of sodium	1·52	1·41
Hardness before boiling, from Fountain, 0·5°; from Inn, 0·5° (Clark's scale)		
Hardness after boiling, from Fountain, 0·5°; from Inn, 0·5° (Clark's scale)		
Nitrogen as ammonia	0·0011	0·0031
,, albuminoid ammonia	0·0022	0·0017
,, nitrates	0·0140	0·0120
,, nitrites	traces	traces
Total nitrogen in these four forms	0·0173	0·0168
Oxygen absorbed by organic matter	0·0720	0·0300

Both samples were satisfactory in colour, but they also agreed in having a slight peaty smell and taste, and the results of the microscopical examination quite confirmed this by showing the presence of an excessive number of minute particles of disintegrated vegetable tissue. There can be no doubt that the main source of this water is good, but, as I have had occasion to remark so often before in these papers, the water needs filtration, and some of the gathering ground is probably peaty.

DARTMOUTH has a population of about 10,000, and nearly the whole of the town is supplied by the local sanitary authority; the supply is intermittent, and from here again I receive the old complaint that the water is sometimes turbid. My sample was drawn by my assistant on October 8 last, and gave the following results:

	Grains per gallon.
Total solid matter	12·90
Loss on ignition after deducting combined carbonic acid	3·16
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	2·69
Hardness before boiling, 5·2° (Clark's scale)	
,, after boiling, 4·2° ,, ,,	
Nitrogen as ammonia	0·0012
,, albuminoid ammonia	0·0017
,, nitrates	0·1400
,, nitrites	traces
Total nitrogen in these four forms	0·1429
Oxygen absorbed by organic matter	0·0220

This is another water of a peaty character, having when warmed a taste of such a nature that it was impossible to mistake it. The microscopical results again gave confirmatory evidence, for the water proved to be full of disintegrated vegetable tissues. This water contained more mineral matter than the last two or three to which I have referred, but as regards nitrogenous constituents it is very pure. It clearly needs filtration, and it is equally necessary that the peaty water should be excluded from the reservoir.

KINGSWEAR, on the other side of the river Dart, is a small place, with a population of only about 2,000. It is supplied from a reservoir, which is said to be fed by springs in the slate shale; the supply is intermittent, but is said to be sufficient. My sample was drawn on October 8 last, and gave the following results:

	Grains per gallon.
Total solid matter	17·40
Loss on ignition after deducting combined carbonic acid	1·04
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	2·93

	Grains per gallon.
Hardness before boiling, 8·8° (Clark's scale)	
,, after boiling, 3·2° ,, ,,	
Nitrogen as ammonia	0·0020
,, albuminoid ammonia . .	0·0030
,, nitrates	0·1540
,, nitrites	traces
Total nitrogen in these four forms . .	0·1590
Oxygen absorbed by organic matter . .	traces

The colour of this water was very good, and it was free from smell. The nitrogenous compounds are fairly low, and the only contamination shown by the microscope was vegetable. It is much harder than any of the waters last referred to, but on the whole must be ranked of a higher class because of the diminution in the vegetable contamination.

In my next paper I shall refer to the supplies of Brixham, Paignton, Torquay, Kingskerswell, Teignmouth, Dawlish, Exmouth, and Sidmouth.

THE SANITARY CONDITION OF MARLBOROUGH AND CLARENCE HOUSES.

IT is no part of the work of this journal 'to kill the slain,' and hence we have refrained from reporting upon the sanitary condition of Marlborough House, because the Office of Works quite two months ago became fully alive to the abominations present in the basement of this building. That it was necessary for Prince Albert Victor of Wales to be attacked with typhoid fever, before the Office of Works would confess that H.R.H. the Prince of Wales and his family were living in a house the sanitary conditions of which must sooner or later result in an attack of illness of so serious a nature, is greatly to the discredit of this branch of the public service. That Prince Albert Victor contracted his illness at Marlborough House has been proved beyond dispute, and such a fact, after the many previous warnings they had received, is one more disgrace added to the long list of blunders committed by the Office of Works. We should not have decided now to give an account of the alterations which have been decided upon at Marlborough House but for the two following reasons. First, because so many erroneous statements have found their way into the papers on this subject that it seems desirable to let the public know exactly what steps are being taken to secure the health of the Prince of Wales and his family for the future; and, secondly, because this, the latest instance of the blundering incompetence of the Office of Works, will become eloquently apparent from such a narrative.

First, then, it ought to be distinctly understood that there is no truth in the statement which has been made with some show of authority that 'Mr. Robert Rawlinson, the *facile princeps* of official engineers, the tutelary (sanitary) genius of Marlborough House, is not associated with the Office of Works in the alterations now being executed. Simply because His Royal Highness, no doubt profiting by past experience, has requested that this gentleman shall from time to time inspect the works in progress, the Office of Works being simply the active and responsible authority, or means to an end. Turning to the work itself, we find that a clean sweep has been made of every old drain and cesspit about the premises. Other drains have been removed from beneath the basement where every floor is being taken up. The entire site will be covered beneath the wood floors by Portland lime concrete, and the flagged portions will be laid on a solid bed of Portland concrete. The drains will be fully ventilated at six points, by iron pipes carried above the roof, and every old closet pipe of *soldered* lead will be removed, and new pipes of *solid* lead, 10 lbs. to the foot, will be substituted. Every kitchen, scullery, or other sink will have the sink-pipes taken to the outside, and will be connected with a ventilated trap.

The floors in the basement will have ample ventilation beneath each of them, and all closets will be specially ventilated. Rain and other pure water will be conveyed away by a separate service, outside the house walls. All dish stands or grids for slop water within the basement will be abolished, and the necessary external yard drains, gully-grates, and pits are to be everywhere renewed. So far as sanitary science can improve an existing house on an old site, those who have this work in hand seem determined to renovate Marlborough House. How far these efforts are likely to be successful our readers can judge for themselves, when we remind them that Marlborough House was built so long ago as 1708. When it was fitted up for His Royal Highness the Prince of Wales, in 1863, no correct plan of the site or drains was in existence, nor has any been discovered since. With such a knowledge of the insanitary condition of the basement of Marlborough House, it seems almost incredible that the Board of Works should have allowed His Royal Highness the Prince of Wales to occupy it, within two years of the lamented death of the Prince Consort from typhoid fever, arising from the neglect of sanitary precautions at Windsor Castle.

It might be urged in extenuation that the Office of Works were ignorant of the probable existence of a network of cesspools and other impurities beneath Marlborough House, had not recent events proved that such abominations have been discovered by their officials and others year after year beneath the adjoining houses, now occupied by the War Office, and by the Eagle Insurance Company.

When reporting upon the War Office in January last, we gave the Office of Works a word of warning by pointing out that 'each or a majority of the cesspools at the War Office drained to a greater or less extent into the Ornamental Water in St. James's Park. A few years ago this connection was cut off from the lakes in question, because the ornamental water was drained off, and the whole of the ponds were cemented throughout. It cannot be erroneous, therefore, to conclude that when this was done as the outlet to the cesspools was thus cut off, the sewage in them not only overflowed but percolated through the brickwork.' Surely when the Royal Commission on the War Office, by their report, endorsed our condemnation of the sanitary arrangements there in almost every particular, the public had a right to expect that the Office of Works would have been fully alive to the insanitary condition of Marlborough House, knowing that they had no plan of the drains and site of this royal residence. Not so, however; for as we have shown above, it was not until the life of Prince Albert Victor of Wales hung in the balance, that the Board of Works began to take steps to ascertain the actual state of affairs. Indeed, it is doubtful if the present discoveries are due to the spontaneous action of this

body, for it must not be forgotten that when Prince Albert Victor's illness proved to be typhoid fever, it was at once announced, on what seemed to be authority, that he must have contracted the disease at Sandringham.

We have no wish to blame any one individual, or set of individuals, in connection with the neglect of duty in sanitary matters which the investigations of the past few years have over and over again traced to those who are responsible for the sanitary condition of the royal palaces, and the Government buildings in the metropolis. The subject is too serious a one to trifle with, especially when the lamented death of Inspector-General Mackay at the Admiralty, the illness of Lord Eustace Cecil at the War Office, the illness of H.R.H. Prince Albert Victor of Wales, and the death of more than one servant at Marlborough House are fresh in the public memory. What we ask for is, not only a searching investigation into the sanitary condition of all the old buildings occupied by members of the Royal Family, but the inauguration of an entirely new system of management in connection with the conduct of the Office of Works. It is surely time that some steps were taken to bring about reforms, for, to quote Mr. Brudenel Carter, 'deaths from typhoid fever are not due to any occult or supernatural causes, but are simply so many murders, resembling, in everything but the element of individual criminality, the starving to death of children in baby farms, or the wanton destruction of life by any other description of neglect.' Yet this neglect in the past has laid many members of the royal family low; has caused the death of Prince Albert, the value of whose life to the nation who can estimate? and may probably in years to come commit even greater ravages, if the present arrangements are not speedily remodelled. What the public ought to do in such a case seems difficult to decide, but they cannot but feel alarmed by the announcement that the Prince of Wales and his family will occupy Clarence House until the alterations at Marlborough House are completed. What is the sanitary condition of Clarence House? Judged by the experience gained in respect to the old houses in its immediate neighbourhood, it is most undesirable that it should be occupied as a royal residence.

Adjoining St. James's Palace, the sanitary condition of Clarence House may be fairly surmised when we state, that this site was originally occupied by a hospital for leprous women, which was pulled down about the year 1600, and on its site St. James's Palace was built. We believe that there is no correct plan of the site or drains of these old buildings, and with the experience of Marlborough House and the War Office to guide us, we hope some steps will be taken to ascertain the true sanitary condition of Clarence House before any more valuable lives are sacrificed. We have felt it our duty more than once before to call attention to the gross neglect of those who are responsible for these matters—a neglect which is the more reprehensible because it not only endangers the lives of eminent public servants, but of members of the royal family. Shall we demand a Commission of Inquiry in vain, or will the bitter experiences of the past result in the accomplishment of the reforms so urgently called for?

IN the death-rate recorded for London last week there were 55 fatal cases of scarlet-fever and 27 of small-pox.

THE

SANITARY RECORD.

FRIDAY, NOVEMBER 30, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

THE INFLUENCE OF BABY-FARMING ON SANITARY REPUTATION.

ALL competent authorities on sanitary science agree that the rate of mortality amongst young lives in any given locality is, as a general rule, an important, though it may be a somewhat rough index of the general sanitary condition of that place. And the reason for such a conclusion is obvious. The sanitary perils to which human life is exposed, especially when closely aggregated, arise chiefly from three causes—polluted water, contaminated air, and specific infection. The ravages which each of these lethiferous agencies cause are far larger amongst children than amongst adults; and the reason here, too, is not far to seek. Apart from the fact that an attack by most of the diseases to which these agencies give rise confers a certain amount of immunity upon the person who escapes from them with his life against a second onslaught, and thus, as it were, renders him proof against the insanitary influences amidst which he may reside, the tenderness and unconsolidated nature of the organism in childhood seems to make it a ready prey to the special disturbing action which the so-called zymotic diseases excite. If, therefore, a town exhibits a high ratio of youthful mortality, it is fair to conclude that there is in this fact *primâ facie* evidence of the prevalence of some insanitary condition there, and it is not unreasonable to proceed to the further inference that such prevalence indicates culpable neglect on the part of the local sanitary authority.

There are, however, two sources of error against which it is important to guard when estimating these circumstances. The first of these arises from the fact that, whether from a carelessness which in some cases almost verges on criminality, or from an ignorance which is scarcely less venial, young children, and especially infants, are too often fed, even by their natural guardians, in so improper a way as to produce as a necessary consequence the malnutrition whose fatal effects swell the registers of mortality under the names of 'infantile diarrhœa, 'convulsions,' and 'marasmus.' The disturbing influence of this source of error is very generally recognised, though it is far from easy to allow for it

in a satisfactory manner in drawing inferences from mortality statistics. The second source of error, however, is one which is not so likely to suggest itself, and to which, therefore, it is desirable to draw attention. It arises from the possible existence in a locality of that peculiar product of modern civilisation, the baby-farm. That such institutions when properly conducted are calculated to supply a real want in the increasingly artificial conditions in which we live it would be unreasonable to deny. But it is equally clear that, looking to the class of infants for whose benefit they chiefly exist, and to the nefarious practices which have been shown to be too often practised in them, they require a most rigid supervision. And the justification of such supervision, for which the Legislature has lately made provision, is to be found in the large mortality which almost invariably prevails in these institutions. It is no part of our object here to discuss how much of this mortality is due to causes that are easily preventable and how much to those with which it is exceedingly difficult to deal. It is sufficient to point out that the existence of any number of such institutions in a given locality may unduly swell the infant mortality of the place, and may lead to very unfair conclusions not only as to the prevalence in it of conditions which are specially prejudicial to early life, but also of those which are inimical to the public health generally.

A good illustration of this fact has recently occurred in the town of Scarborough. It appears that the medical officer of health, Dr. John Taylor, has been much exercised of late on the large amount of infant mortality which has prevailed in the town. The deaths of young children are stated, on good authority, to have increased recently by leaps and bounds, until at length they promised, if unarrested or unexplained, to develop into a public scandal. So long ago as 1873, public attention was sufficiently aroused in regard to this matter to lead to the establishment of an infant day nursery. One-fourth of the total number of deaths occurring in the town at that period, we are told, were those of children of tender age. As is usually the case, the majority of these abortive fledglings were illegitimate offspring. In 1874, of sixty-six of these unfortunates, thirty-four, or more than one-half, died during the first year of their existence. In 1875 somewhat over a third of those born thus untimely perished, whilst last year only nineteen died out of sixty-seven.

Under these circumstances it is scarcely a subject for surprise that the borough authorities have for some time had the matter under their earnest consideration. The fair repute of the town was not only being compromised—although, as will appear from the above statistics, in a diminishing degree, by the general death-rate being so inordinately increased—but, what was, perhaps, worse, the locality was acquiring a distinctly evil name as a health resort for children. At last the fire which had been so long slumbering burst forth, and the opportunity for interference which the medical officer of health seems to have been for some time seeking offered itself in the fact that out of twenty-five deaths registered in one week, five were those of illegitimate children, three of whom died within a fortnight at one house. It was felt by the sanitary authorities that this was somewhat too flagrant an exercise of the Western form of 'happy dispatch' to be quietly tolerated, so the keepers of the establishment in which this excessive mortality occurred were haled before the magistrates on the charge, not of child-murder—for of that there was no satisfactory evidence—but of having infringed the Infant Life Preservation Act by taking in children and doing for them in a house which was not registered for the purpose. There was no attempt on the part of the defendants, who were very ably represented by their legal adviser, to deny the charge. Their statement was to the effect that though the children had unquestionably departed this life, as had been alleged, they had died from ordinary causes, and that they been ushered out of existence *secundum artem*, as was testified by the certificate of the medical practitioner who attended them. The bench, after duly considering the case, imposed a penalty of 20*s.* and costs, and the defendants left the court without, we presume, to use the stereotyped phraseology in such contingencies, any serious stain upon their character, but with the intention, we have no doubt, to put themselves more *en règle* with the law for the future by taking out a licence to carry on under municipal supervision their somewhat thankless means of livelihood. Meanwhile the authorities of Scarborough will doubtless be on the alert to detect any similar acts of malfeasance; and though baby-farming will in all probability be carried on in their midst with as much vigour as heretofore, they will have the satisfaction at any rate of ensuring that it shall be done with some regard to public decency. But it is scarcely to be hoped that their death-rate will be very materially diminished. Whether it be that the morality of the Northern watering place is somewhat shady, or that there is some specific attraction which leads illegitimate infants to gravitate naturally towards it, we know not. So long, however, as the supply of facilities for relieving unmotherly mothers of their offspring continues active in Scarborough so long we fear that it must pay the penalty of this doubtful distinction by exhibiting a death-rate considerably in excess of what its general sanitary condition in other respects would entitle it to expect. The only advice that we can suggest is that it should get the Registrar-General to append to his periodic notices under this head an explanatory intimation to some such effect as this: 'Mem. Here baby-farming is extensively carried on.'

Notes of the Week.

ST. ANNE'S-BY-THE-SEA, Lancashire, has been constituted a Local Government District, and the board is to consist of twelve members.

EIGHTY pounds a year can, it is believed by the Woolwich guardians, be saved in water-rates and soap by utilising the rain water, as the water of Kent is very hard.

THE Metropolitan Board of Works have approved the schemes under the Artisans' and Labourers' Dwellings Act, 1875, for the areas in Essex Road, Islington; Bowman's Buildings, Marylebone; and Great Wild Street.

THE Nantwich Guardians have passed a resolution to combine with the Rural Sanitary Authorities of Altrincham and Congleton, and the Urban Sanitary Authorities of Lymm, Middlewich, Sandbach, and Winsford, in appointing a medical officer of health, at 800*l.* per annum for three years.

A LONG discussion took place at the last meeting of the Metropolitan Board of Works on a motion introduced by Mr. Fowler to rescind the resolution recently passed in favour of going to Parliament for a bill with a view of securing to the metropolis a better supply of water. Mr. Fowler's motion was rejected by 23 to 20 votes.

A RESOLUTION was passed unanimously at the Court of Common Council of the City of London, on Thursday week, empowering the Gas and Water Committee to confer with the Government and the Metropolitan Board of Works upon the subject of the supply of water to the metropolis.

AT a special meeting of the Heywood Local Board it was announced that the Queen had presented to the town twenty acres of land for the purposes of a public park. The money has been set apart by the Queen out of a sum exceeding 10,000*l.* which fell to her as Duchess of Lancaster, through the death, without heirs, of Mr. C. M. Newhouse, of Heywood.

THE West Kent Main Sewerage Board, on the 14th inst., raised the salaries of several inspectors of works in their employ, and appointed Mr. Wright to be an additional inspector, making the eighth. It was stated that an agreement with the Sevenoaks urban sanitary authority, for admission of that town into the board's system, was in course of preparation.

A PRIZE of 150 marks has just been awarded to Otto Hehner, F.C.S., public analyst for the Isle of Wight, and Arthur Angell, F.R.M.S., public analyst for the county of Hants, for their essay on butter analysis. The award was made by Professor Heintz and Professor Knop of Leipzig, examiners for the Pharmaceutical Association, Leipzig. Six essays were sent in for competition, two from Germany, one from Austria, one from Italy, and two from England.

ALFRETON, Derbyshire, is to be supplied with water by intercepting the springs issuing from the gritstone rock on the high land to the west of the town, and conveying it by pipes to a high level reservoir at Somercotes. The Local Government Board have sanctioned the borrowing of 10,000*l.* by the Belper Rural Sanitary Authority, and 10,500*l.* by the Alfreton Urban Sanitary Authority, for the purpose of executing the necessary works, which it is estimated will occupy about twelve months, and will supply twenty gallons per head of the population, which at the last census was 11,480.

THE new sluice at the Middle Level Works, near Lynn, has been opened. The engineer is Sir John Hawkshaw, and the contractor Mr. Webster. The cost is between 40,000*l.* and 50,000*l.*, and by it 200,000 acres are to be drained, and rivers to the extent of 200 miles. The sluice is in substitution for syphons, which will now be discontinued. It is said that the fen country of the Isle of Ely will now be safe from inundation.

THE intercepting sewer of the Salford drainage scheme, which is now approaching completion, has cost nearly 91,000*l.* The supplementary works, the plans of which Mr. Fowler, C.E., the late Salford borough engineer, prepared, are about to be commenced at Mode Wheel, and will, it is estimated, bring the total expenditure of the whole scheme to something like 150,000*l.*

VILLAGE WATER-SUPPLY IN DERBYSHIRE.

AT the last meeting of the Chesterfield Rural Sanitary Authority, the engineer presented a report of a scheme for a new water-supply for about twenty villages in East Derbyshire. It is proposed to gather the water from the Moorlands, near Baslow, eight miles from Chesterfield, on the estate of the Duke of Rutland, and to construct a reservoir capable of holding 15,000,000 gallons of water, at a place known as Fox Lane. The estimated cost is 20,000*l.* The clerk was instructed to communicate with the Eckington Waterworks Company with a view to ascertain if they will sell their works, which it is thought desirable should be embodied in the scheme.

THE DILUTION OF GIN.

AT a meeting of licensed victuallers and wine and spirit merchants, held at York, to consider the recent decisions in reference to the adulteration of gin with water, a letter was read from the Chancellor of the Exchequer, stating that it was impossible for him to say just yet what could be done with regard to the subject. The question of the reduction of the strength of gin by water was not a revenue matter. The Local Government Board were now, he believed, consulting the Inland Revenue Department, and the whole subject would be fully discussed, with a view to determine whether any legislation was practicable or desirable.

WHOOPING-COUGH.

DR. TSCHAMER, of Gratz, has discovered that a fungus grows upon the skins of apples and oranges which is precisely similar to the fungus which forms the peculiar germs of infection in whooping-cough. He writes to us that on oranges and apples which have been kept some time may be found dark brown and black specks which when scraped off appear as a damp powder. Under the microscope this powder is seen to consist of the spores of a fungus identical with those of the whooping-cough fungus. Taking two of these specks from the skin of an orange Dr. Tschamer introduced them by a strong inhalation into his lungs. The next day tickling of the throat began which gradually increased until at the eighth day a thoroughly developed whooping-cough set in. The expectorata, on microscopical examination, exhibited the same white corpuscles which characterise the expectorata of the usual children's whooping-cough. Should this discovery be confirmed, there is an additional reason to see that children abstain from eating apples with the skin on, and from chewing orange-peel, which many are so fond of doing.

'WAKING' THE DEAD.

AT a recent meeting of the York Board of Guardians, Mr. W. Hood, one of the union surgeons, referred to an outbreak of scarlet fever confined to a small area of space. He had fifteen or twenty cases, all of which were attributable to the practice amongst the Irish of 'waking' the dead. In one fatal case last month he had occasion to go

to the house in the morning, and there he found some twenty people sat round the room on benches and other conveniences, and in their midst a child which had died of scarlet fever, gorgeously laid out in its coffin. He expostulated with the party, and told them of the serious consequence which might ensue of their conveying the disease to their own children. They listened to him and went away, but only to be replaced by other neighbours who were found to be present at the same place in the afternoon. This went on each day until the fourth, on which the child was interred. The same thing had occurred in other cases, and he thought the board would do well if they would insist on a more speedy interment after death. He had mentioned the matter to the Roman Catholic priest of the district, who had spoken about it from the pulpit, but as yet with little effect.

WATER-CRESSES.

AT the last meeting of the Royal Horticultural Society Mr. Shirley Hibberd presented a dozen pans of water-cresses, grown in the manner he has practised and recommended for some years past. One of the advantages of this system is that the plants are under complete control to be placed in the sun or the shade, or, during winter, in heated plant-houses, and can at all times be supplied with pure water, and thus be preserved from contamination by the pollutions common to rivers, brooks, and even water-cress beds. The pans in which they are grown measure from 15 in. to 20 in. across, and from six to nine inches deep, the smaller size being described as most convenient. The pans are filled with rich loamy soil, intermixed with lumps of chalk or old mortar, and then very small cuttings are inserted. These soon become strong plants, and in from 15 to 20 days they may be gathered from, the cresses being tender, and delicate in flavour, and of the most beautiful appearance. The twelve plants shown have been regularly gathered from for the table for a period of six weeks, and their fresh and robust appearance indicated that they might be cut from for another six weeks without being exhausted. The sorts shown were the Erfurt sweet green cress, the Springhead brown cress, and the Stoke Newington purple cress. The adjudicators signified their approval of this mode of cultivation by the award of a medal to Mr. Hibberd.

SOUTHPORT SEWAGE WORKS.

COLONEL COX, Inspector to the Local Government Board, has held an inquiry, at Southport, on an application from the Corporation for sanction to borrow an additional 30,000*l.* to carry out the sewage works, from plans by Mr. Mansergh, C.E. 50,000*l.* had, it was stated, already been borrowed under the Local Improvement Act, and this was the original estimate for the cost of the sewage works, but when the borough was extended the works were enlarged, and the estimate then made by Mr. Mansergh was 70,000*l.*, the contract being eventually let for 72,663*l.* The contractors, however, got into liquidation with the Corporation, and the works were relet for 88,000*l.* This application would exhaust the present borrowing powers of the Corporation, but they would borrow under the Public Health Act for the rest. It was intended to carry out still further sewer construction, but to spread it over 10 or 15 years. Mr. Mansergh, C.E., was examined by the inspector, and said that up to the end of July, 52,818*l.* 7*s.* had been spent on the measured-up work, and 4,937*l.* on extras. The work to be done, according to the estimate, amounted to 35,570*l.*, and extras on that being 1,394*l.*, made a total of 94,840*l.* The difference in the contract arose partly from an additional quantity of timber being absolutely required to be put into the work, partly as the inevitable result of a change of contractors, together with the gradually increasing price of work. The estimate was originally advanced from 50,000*l.* to 70,000*l.*, owing to the enlargement of the main sewer on plan from 5 ft. 3 in. to 6ft. 4 in. It has been all lined with blue bricks, and altogether said Mr. Mansergh, the job has been a very costly one. No opposition was manifested by ratepayers, and at the close of the inquiry the Local Government Board inspector visited the works in progress.

BRENTFORD DRAINAGE SCHEME.

MAJOR L. FLOWER has sent in his report to the members of the local board of Brentford, and we gather from it that he proposes to retain the old sewers for the purpose of the disposal of surface and storm waters. He recommends stoneware pipes, proper syphon traps between house and sewer, and a ventilating pipe on the house side of the trap. As to the question of sewage disposal he is of opinion that they can safely adopt precipitation, as the least expensive and most available mode of disposing of the sewage. He says that towns must not expect to make fortunes out of their refuse, and that sewage manure factories do not pay. It would be ungenerous, he adds, in a public report, to set forth individual systems, the failure of which are matters of history, and only recommends one as eminently suitable; one which he is glad to see is fast coming into public favour and official notice, namely, the Hillé process, which does not profess to make water fit for drinking purposes out of sewage, nor a valuable manure, but to produce a harmless effluent, and a comparatively inodorous sludge, at moderate cost. Mr. Hillé's system he describes as consisting of magnesium chlorides, tar and other chemicals, with lime in a certain condition. The result, when applied to sewage, is that a deposit is very rapidly effected. He has found the effluent sufficiently pure to be admitted to streams, and the treatment constant. One special feature of the system is daily cleansing of the tanks and frequent removal of the deposited sludge. Major Flower has suggested tanks sufficient in capacity to take the sewage of 25,000 persons daily; which will amply provide for the rapidly increasing population. These tanks are also recommended to be well above ground in order to keep the works above the reach of possible floods, but to get as much open air as possible around them. The chemicals are to be applied to the sewage in a tank below ground and pumped together to the depositing tanks, so that no nuisance can result from the operation. The engines and pumps are to be in duplicate, and the effluent from the tanks, he concludes, be discharged over a lip and broken up by a cascade, thus getting oxidation from the air.

WINDMILL LOCAL BOARD.

A CORRESPONDENT sends to the *Yorkshireman* the following report of the meeting of a little parliament of some reputation close at hand. He says it will stand for any number of meetings, past and future. 'WINDMILL LOCAL BOARD.—This board held its two usual fortnightly meetings last night, one in the Board Room and another at the Foragers' Arms. There were present Mr. Benjamin Peartree, chairman, Mr. Jonathan H. Weathercock, Mr. Fawthrop Firth Dowson, Mr. John Weathercock, Mr. F. W. Weathercock Both, Mr. Joseph Cordwainer, Mr. Thomas Bengy, Mr. James P'Shaw, and Mr. James Tweedledum. The first business was the reading of a letter from one of the engineers of the board, Mr. John F. Razor, from which it appeared that satisfactory progress (on paper) was being made with the Windmill and Sticking bridges. Mr. Tweedledum objected to this business being pushed on hurriedly. The matter having only been before the board three or four years, further time should be taken to consider it. Mr. Jonathan H. Weathercock observed that the improvements in Howling Lane were far more urgently required. Mr. Jawit, the clerk, intimated that as the money borrowed for the bridges had been spent elsewhere, this business must stand adjourned to the next meeting. Mr. Tweedledum reported that the board's water meter had registered 987,654,321 gals. 3 qts. 1½ pt., in the last fortnight, which was 2½ gallons above the average: he thought this was an alarming leakage and

ought to be attended to.—Mr. Jonathan Weathercock again, for the fifty-eighth time, brought forward the alarming encroachments upon a lane near his estate, made by Messrs. Squint. Never while he had breath would he let that subject drop, except the obstructionists were brought to justice.—Solemn silence by the rest of the board.—The alleged encroachment by Mr. Thomas Stingsby in Water Lane was introduced for the nine hundred and sixty-eighth time. It appeared that two hundred and three resolutions had previously been passed on this business and fifty-seven committees appointed. At the request of the Clerk it was decided to let the matter stand over until a new minute book has been procured.—A deputation waited upon the board from Bosman's Field, and complained that there were no drains in that part of the board's district, and that the roads, being soddened with sewage, were impassable. It was considered, after a short discussion, to be too frivolous a matter for this board to bother with.—A letter was read from a resident on Windmill Slag complaining that he could not open his door or windows without having his house filled with black smoke from the mill chimneys below the canal. The Chairman wunk at Mr. P'Shaw, Mr. P'Shaw wunk at the Smoke Inspector, and it was agreed unanimously to do—nothing.'

NEWMARKET SEWAGE DISPOSAL.

THE Newmarket Urban Sanitary Authority have long been exercised in their minds as to the most happy method of dealing with their sewage. After paying for and then rejecting an elaborate scheme prepared at their request by Mr. Baldwin Latham, the sanitary authority advocated a second scheme at the Local Government Board inquiry, which, also at their direction, was prepared by Mr. Clarke, of Newmarket, and which, notwithstanding opposition, was with some modifications carried and received the sanction of the Local Government Board. Hardly had the sanction been obtained and the necessary notices served than the Newmarket Sanitary Authority were persuaded that two of their own members were prepared with a third scheme, which, at a cost of 700*l.*, would accomplish more than the former schemes, estimated at almost as many thousands. What the precise nature of the scheme is has not yet transpired, but the following is the 'instrument for the disposal of the sewage without the intervention of the Government':

'CHAIRMAN AND GENTLEMEN,—We, the undersigned members of the Surveyor's Committee, have heard through a most reliable source that Mr. Dobede intends to raise great objections against the Newmarket Board of Health taking any of his land in the neighbourhood of Exning for the purpose of sewerage works. Mr. Dobede intends disputing to the very utmost such works being carried out anywhere near the village of Exning; therefore the Surveyor's Committee do hereby strongly recommend to the board the advisability of purchasing a piece of ground of Mr. Dobede, at the north end of the town of Newmarket, for carrying out such sewage works as are required to abate such nuisance as may now exist, rather than the board should get into any law proceedings with Mr. Dobede, which can be done at a very much less expense than the now proposed scheme, and which can be paid for out of the common rate, and we shall be doing our duty to the ratepayers. GEORGE KERRY.

'Newmarket, Oct. 31, 1877. SAMUEL QUINCE.'

One immediate result of this 'instrument' is that the chairman has sent in the following resignation:

'DEAR SIR,—I beg hereby to give in my resignation of both chairmanship and membership of the Newmarket Local Board of Health. Nobody is more desirous than myself to assist in the transaction of such of the business of the town as is conducted at the Local Board of Health, so long as the same can be done with decent comfort. But I cannot blame myself, nor can you or anyone present blame me, for declining to submit myself to a repetition of the occurrences of the last meeting. I have to thank almost all the members of the board for their courteous treatment of me during my chairmanship. Yours truly,

'Yarmouth, Oct. 29, 1877. W. O. KITCHENER.

'To Mr. James Button, Esq.,
'Clerk to the Local Board of Health,
'Newmarket.'

The first scheme prepared by Mr. Baldwin-Latham was estimated by him, 'including outfall works and laying-out twenty-five acres of land for the reception of the sewage including engineering and superintendence,' at 1,300*l.*, 'and the effect would be that a sum of 70*l.* 13*s.* 8*d.* would be required every year to pay off the principal and interest of the amount which would be less than 1*d.* in the pound on the rates of the district.' This scheme, which did not include the internal sewerage of the town, was thought insufficient, and Mr. Latham was instructed to prepare plans for a complete and more comprehensive scheme, which he did, at an estimated cost of 13,500*l.*, including price of land and every possible contingency.

Special Reports.

THE LONDON WATER-SUPPLY.

AT a meeting of the Wandsworth District Board of Works, on the 21st inst., the General Purposes Committee reported that they had inspected the works of the Southwark and Vauxhall Water Company at Nine Elms and Hampton. The committee found at the works at Nine Elms that the filter-beds were being cleansed and reconstructed, and that improvements were being effected there for the purpose of more effectually filtering the water; but, after a careful inspection of these works, the committee came to the conclusion that such works ought to be entirely removed from their present position, where they are exposed to a deleterious atmosphere. The committee were informed that land has been for some years obtained by the company at Hampton for the purpose of improving the character of the water-supply. They were, however, surprised to find that nothing had hitherto been done there towards constructing subsiding tanks and additional filter beds, so repeatedly insisted upon by the Government inspector as the only way of insuring the supply of pure water, and the committee recommended that the Local Government Board be requested to insist upon the immediate construction of such subsiding tanks. The committee also recommended that a communication be addressed to the Local Government Board strongly urging that some measures should be at once adopted to prevent or at least to decrease the pollution of the water at and above the intake. The report was unanimously adopted without discussion. At a meeting of the Fulham district board of works, also held on the 21st. inst., a resolution was carried by a large majority approving the proposal of the Metropolitan Board of Works to purchase the rights of the existing water companies of the metropolis, but strongly condemning the scheme for providing an additional supply of pure spring water at so large an estimated cost as five-and-a-half millions sterling.

THE DISPOSAL OF TOWN SEWAGE.

THE following letter from Dr. Woodforde, the medical officer of the Abingdon district to the local authority, will be read with interest by all those who are engaged in the disposal of town sewage. It illustrates the extraordinary power of natural soil to purify foul liquids if they are passed through it.

At Abingdon, in the valley of the Thames, Messrs. Bailey Denton, Son and North, have carried out the combined system of intermittent downward filtration and surface irrigation and the whole of the sewage discharged (to the extent of 100,000 gallons daily) has often been absorbed

and cleansed by one acre of land. This is some evidence of what may be done in the valley of the Thames generally of which the soil is very similar to that near Abingdon.

'My dear Sir,—At my request Mr. Winship, your sanitary inspector, has forwarded two samples of the effluent from the Abingdon new sewage works, which I have submitted to analysis (and I am glad to be able to report for the information of your authority) with extremely satisfactory results.

'He informs me that at the present time 100,000 gallons of sewage are dealt with every twenty-four hours, and that 247 houses have already been connected with the main sewers (including their W.C.'s). The two samples of effluent water were taken on October 26 at 10.30 A.M. and 4.30 P.M. respectively; both were bright, colourless, and odourless—the same quantity of solids and nearly the same of "chlorides" was contained in each—the former being but little in excess of the amount in many good drinking waters, and on submitting a mixture of equal parts of the two samples to distillation for ammonia (the measure of organic pollution) the result, as shown by the subjoined figures, were not more than double those of ordinary London drinking water as regards the most important (the albuminoid) form.

	Parts in a million grains in gallon					
	Free Ammonia	Albuminoid ammonia	Oxidisable matters	Chlorine	Solids dried at 212° Fahr.	Nitrites and Nitrates
A standard water.	0·03	0·07	,,	0·7	10 to 20	
Average London water	0·01	0·07	,,	0·8	,,	
Effluent, 10.30 A.M.				2·8		
From sewage works, 4.30 P.M., Oct. 26, 1877	0·10	0·12	3·0	2·9	36·4	moderate
Samples of Well Waters, Abingdon.						
No. 1. A deepened well near the Ock.	0·64	0·16	4·0	3·9	42·0	very large
No. 2. Ock Street New Tube Well	0·80	0·16	2·0	6·0	77·0	moderate

'Mr. Winship at the same time sent two samples of well water for my examination, both of which were exceedingly bad and in all respects very greatly below the quality of the "sewage effluent."

'Yours faithfully,

'(Signed) W. T. G. WOODFORDE.

'Oakbank, Reading, November 9, 1877.

'To Bromley Challoner, Jun., Esq., Clerk to Abingdon Urban Sanitary Authority.'

THE INSTITUTION OF CIVIL ENGINEERS.

AT the meeting of this society, on Tuesday, the 13th instant, Mr. G. R. Stephenson, president, in the chair, certificates were read in favour of the election of seven members and thirty-four associates, who will balloted for on the 4th proximo. It was announced that the Council, acting under the provisions of Section IV. of the by-laws, had transferred the following associates to the class of members, namely: Messrs. James Bisset, Port Elizabeth; George Bohn, Hull; Edmund Small Cathels, Montreal; William Langton Coke, Cape Government Railway Staff; George Cooper, Buenos Ayres; Henry Algernon Shrapnel Fenner, Loodiana, India; William Grey Ferrar, Romford; Richard Garrett, Leiston; Henry Johnson, Punjab Northern State Railway; George Knowles, Queen's Gardens; Charles Lean, Acton; Alfred Penny, Westminster; William George Scott, Liverpool; George Kelson Stothert, Bristol; William Cawthorn Unwin, B.Sc., Royal Indian Engineering College; Irwine John Whitty, Giridhi, Bengal; and Corbet Woodall, Bankside; and had admitted the following candidates as students of the institution, viz.: Alfred Dyke Acland, James George Willcox Aldridge, Robert Alexander Briggs, Ernest Augustus Brine, Francis Crawford Caffin, John Forbes Close, George William Disney, Wynne Howard Edwards, Lewis Frederick Evelegh, Edward Brocklehurst Fielden, Gerald FitzGibbon, Robert FitzGibbon, George William Hersey, Percy William Monckton Holt, John Wykeham Jacomb Hood, Henry Edmund Kitson, Arthur Huntington Leaf, Alexander Maclachlan, Fran.: Nelson, William Vye Paddon, Henry Parkes, Hugh Frederick Perkins, Samuel Sydney Platt, William James Robson, Thomas Parr Severn, Walter Edward Slade, Henry Snell, Alfred Summerscale, John Henry Tudsbury Turner, Montagu Alexis Pollard Urquhart, Delfin Vieyra, Wilhem Willink, Fred Worsnop, and Thomas Herbert Wright.

WESTERN COUNTIES ASSOCIATION OF SANITARY INSPECTORS.

THE usual quarterly meeting of the above association was held on Monday, the 12th instant, at Weston-super-Mare. The president and several members from the counties of Gloucester and Somerset attended. The minutes of the last meeting were read and confirmed, when several matters referring to water supply and drainnge were discussed.

Medical Officers' Reports.

BATH.—The average mortality per 1,000 of population for the city and borough of Bath has been unprecedentedly low for the fortnight ending November 7, not only as regards comparison with sanitary reports of past years, but also as compared with the weekly reports published by the Registrar-General. The following is the substance of the fortnightly report of Dr. Brabazon, medical officer of health for the city of Bath, for weeks ending October 31 and November 7 respectively: The average mortality per 1,000 of population in Bath for week ending October 31 was 7·9. According to report of Registrar-General for week ending October 27, average mortality per 1,000 in London was 22·1. The range in twenty English towns varied from 18 at Portsmouth to 31 at Salford. The average mortality in Bath for week ending November 7 was 5·9 per 1,000. The report of Registrar-General for week ending November 3 states the average mortality per 1,000 of population in London at 21·4. That of the twenty English towns from lowest to highest varied from 11 at Nottingham to 33 at Plymouth. The mortality from zymotic disease in London during week ending October 31 averaged 3·5 per 1,000; ditto during week ending November 3 averaged 3·4 per 1,000. Not one of the twenty English towns referred to by the Registrar-General presents a clean bill of mortality from zymotic disease. There has not been one death in the city of Bath from such causation during the above-mentioned period. The nearest approximation to the extraordinary low average mortality for week ending November 7 is that recorded for week ending July 16, 1873, being 6·9 per 1,000, but low averages of mortality have not been unknown in Bath in former years, as proved by the following statistics extracted from report book. Average mortality per 1,000 as recorded: October 27, 1869, 9·7; June 5, 1872, 7·9; July 16, 1873, 6·9; September 9, 1874, 8·7; December 20, 1876, 7·9.

HACKNEY.—Dr. Tripe, in his annual report for 1876, is able, notwithstanding the severe small-pox epidemic, to return almost the lowest death-rate on record, namely, 18·5 per 1,000 per ann., while the birth-rate reached 35·8 per 1,000. This low death-rate is the more noticeable in the face of the decrease in the wealth of the inhabitants of the district, and the increase of the density of the

population. Dr. Tripe is a firm believer in the protective power of vaccination, and quotes Drs. Jenner and Marson as authorities. Dr. Tripe's own statistics and observations do not afford any absolute evidence on this oft-discussed point, but they do show that, on the occurrence of the epidemic, vaccination had been considerably neglected in the Hackney district.

The report is so full of interesting and important matters that we cannot attempt to condense it, but would note the connection Dr. Tripe has apparently established between sewer emanations and diphtheria. If—and we have no reason to believe otherwise—Dr. Tripe's observations are correct, it is highly dangerous to attempt to ventilate or relieve the pressure on our sewers by means of down-spouts, at least by badly-jointed ones.

KENSINGTON.—The deaths during the four weeks ending September 15 are reported by Dr. Dudfield to have been only at the annual rate of 12·3 per 1,000, against 18·2 for the whole metropolis. There was only one death from small-pox. Dr. Dudfield discussed the question of the spread of small-pox from the Asylum Board's Hospital, which is situated in the most severely affected district, and says that, as the hospital is completely isolated from dwelling-houses, he cannot see how the two facts are connected. In support of his view he quotes the fact that no small-pox case has been known to have occurred within a quarter of a mile of the small-pox hospital at Hammersmith. As regards the outbreak near the hospital, he has not been able to trace the source of infection, but, as the disease was prevalent in parts of Chelsea and Fulham, it is probable it was disseminated from one or the other localities. He applied to the medical officers of health for Hampstead, Lambeth, and Hackney, and was informed by the former that there is no evidence to show that small-pox has spread from the hospital, by the second that he believed the disease had spread from the hospital, and by the third, that he entertained some doubt in the matter. These last two hospitals (at Stockwell and Homerton) are situated near to houses, and have undoubtedly received a larger number of patients than should have been sent there, considering the size of the ground.

ST. PANCRAS.—The population is estimated at 233,000; the births registered were 8,317, and the corrected deaths 5,019, giving a death-rate of 21·54 per 1,000, which is 1·67 below the average. The deaths of infants under one year were 24·8 per 100 deaths at all ages, and 15·5 per 100 births which is low. The deaths from seven chief zymotic diseases were 3·58 per 1,000 living; from inflammatory diseases of the lungs 4·86, and from tubercular diseases 2·65. There were only 22 deaths from small-pox, against an average of 67, but measles, whooping-cough, and diarrhœa were unusually fatal. Dr. Stevenson attributes the small number of small-pox cases to their early removal to hospitals, one of which was specially provided by the sanitary authorities. He also refers to certain dilapidated houses which cannot be dealt with under the Artisans' Dwelling Act, 1875, and to others, which under the Midland Railway Improvements Act, are shut up when they get into a very bad state. The sanitary table is kept so that it is difficult to tell how many of the 1,815 complaints received were officially dealt with, but as there were only 2,000 premises inspected there cannot be any systematic inspections of the poorer houses, such as is attended with the best results in some other metropolitan parishes and districts.

Law Reports.

DAMAGES FOR BITE OF A DOG.

AT the Southwark county court a little girl named Palmer, ten years of age, by her father, sued Mr. M'Quillen for damages in consequence of being bitten on May 20 last by a dog of the defendant's, in the public highway, in front of his residence. It was shown that although the dog was believed to be harmless, and was a favourite with the children in the neighbourhood, it had on one occasion, two years ago, bitten a boy. The jury found a verdict for the plaintiff, 15*l.* damages.

DISPUTE AS TO WATER-SUPPLY.

IN the Warwick county court, on the 6th inst., an action was brought by Mr. John Oldham, contractor for supplying water to Leamington, to recover 49*l.* from the corporation of that town, for water supplied to that town over and above the quantity which he was required to supply. The plaintiff's contention was that according to the terms of his contract, after giving due notice to the corporation, he was entitled to charge 7*d.* per 1,000 gallons, instead of 1½*d.* for any quantity supplied over 500,000 gallons per diem. After hearing Mr. Buszard and Alderman S. T. Wackrill (chairman of the Waterworks Committee), the judge held that the plaintiff's case had been completely rebutted, and that he was not entitled to the extra charge. The contract must be read in its entirety, and the mere fact of the plaintiff giving the corporation the notice which he had done did not constitute a bargain to pay the additional amount, unless the corporation assented. He therefore gave judgment for the defendants, with costs.

ADULTERATION OF GIN.

J. A. EVERARD, of the Spread Eagle, 56, Broad Street; J. H. Francis, of the Sun, 21, Drury Lane; W. C. Butterfield, of the Crown, 1, Great St. Andrew's Street; J. L. Graydon, of the Mogul, 16, Drury Lane; J. Turner, the Old King's Arms, 35, Short's Gardens; and E. A. Hitchin, the White Hart, 191, Drury Lane, appeared before Mr. Vaughan to answer adjourned summonses charging them with adulterating gin with water. The cases were adjourned until the decision had been given in the Court of Appeal upon one summons, in which Mr. Vaughan had been asked to state a case. His worship's conviction having been confirmed, Mr. Vaughan, after hearing the remarks for the defence, fined each defendant the mitigated penalty of 5*l.*, at the same time observing that if any cases of a similar sort occurred after this the full penalty of 20*l.* would be imposed. If it were thought necessary to adulterate gin a label ought to be placed on the bottle. Mr. Child said the association which he represented had recommended all the members to conform with the Act by putting on labels respecting the strength of the gin. It was impossible to sell it for consumption in the state in which it was received from the wholesale dealers, for it would be injurious to those taking it. Mr. Vaughan said that was the proper course to pursue in order to avoid prosecution.

INFECTED CLOTHING.

AT Lambeth, E. Whitman and L. Weller, both living at Battersea, appeared to a summons, taken out by the Vestry at Lambeth, for having without disinfection transmitted clothing which had recently been exposed to infection from small-pox. It was shown that small-pox had broken out in the families of the defendants, and subsequently clothing was pledged at a pawnbroker's in the Wandsworth Road. Emblen, one of the inspectors of nuisances, hearing of the circumstances, at once proceeded to the pawnbroker's, and had the clothing removed for disinfection. The defendant Whitman declared that she was not aware that her husband was suffering from small-pox, and relied on a certificate from a doctor that he was suffering from a cold. The sanitary inspector said the certificate that Whitman's husband had the small-pox was dated on the 11th of August, and in two days the clothing was pledged. Mr. E. Howard, a surgeon, stated that on August 9 he gave a certificate that the husband was suffering from a cold. On the 11th of the month he found small-pox had broken out, and in-

formed Mrs. Whitman. The other defendant lodged in the same house. Mr. Ellison was of opinion that the defendant Weller might have acted in ignorance, but the other defendant had not. She must have known, after receiving the certificate of the doctor, that it would be improper to pledge the articles. Emblen informed the magistrate that the pawnbroker, in order to guard against disease, had a large printed notice posted in his shop cautioning persons from offering goods in pledge that had been exposed to fever or other contagious diseases, or they would be liable to a penalty of 5*l.* The pawnbroker had been compelled to adopt the precaution from the fact that two of his assistants had during the epidemic of small-pox been seized with the disease, doubtless through infected clothing. Mr. Ellison dismissed the summons as to Weller, and ordered the defendant Whitman to pay 5*l.* and costs.

INFRINGEMENT OF LOCAL BY-LAWS.

W. MELLHUISH and H. Pearce, builders, of Bournemouth, were charged with having proceeded with the erection of buildings without having delivered plans and sections of the work to the Surveyor to the Commissioners, contrary to the by-laws and to the statute. Defendants said they bought the land with the understanding that the building plans were passed. Mr. Druitt, on behalf of the Commissioners, stated that the proceedings were taken under the 28th and 29th by-laws, sanctioned by the Local Government Board in 1877. The provisions of the Public Health Act, 1875, consolidated all by-laws relating to local boards, and said that all by-laws which had been made before that Act came into force should be considered as by-laws under that Act. He then quoted by-laws 29 and 34, the former directing that all persons about to build should a fortnight previously give notice to the Commissioners, deposit plans and sections, and the latter fixing the maximum penalty for neglecting this at 5*l.* In this case the defendants had commenced to build four houses; plans had since been sent to the board, but had not been approved of. In spite of this defendants had still gone on with the building. G. R. Andrews, assistant surveyor, said he visited a piece of land at West Hill, and found that two cottages were being built. He inquired who the builders were, and saw Pearce, and informed him that plans had not been deposited. Pearce said they had, and witness said he would make inquiries at the office. He went to the buildings again on the following day, and again told defendants that plans had not been deposited and that they were building at their own risk. On October 2, he found the defendants still proceeding. Defendants again stated that they bought the ground with the understanding that the plans had been deposited, but on learning that this was not the case they gave instructions to Mr. Hillier to prepare plans. They called J. Hillier, architect, who said his father prepared plans for Mr. Williams for the building of two terraces at West Hill. They deposited one plan with the Commissioners, and it was similar to that afterwards sent to the Board on behalf of Messrs. Pearce and Mellhuish, with the exception that the wall plates were a little lower. The defendants bought the land of Mr. Williams. The plans deposited by the Commissioners did not show the houses on both sides of the road, but only on one side—the side opposite to that on which the defendants were now building. The defendants were then charged with proceeding to lay out a new street at West Hill Road, Bournemouth, without having given notice, as required by the by-laws and the statute. Mr. Druitt said this action was taken under the 28th section of the Bournemouth Improvement Act, which required persons about to lay out a new street or road, to give notice to the Commissioners, and to deposit plans. Mr. Gifford said no notice was given at the Commissioners' office, or plans deposited by the defendants, for a new street until October 26, and the plan then handed in was not in accordance with the by-law. Mr. Gifford, in answer to the magistrates, said the Commissioners sanctioned the plans for one terrace, deposited by Mr. Williams, but they did not take the road into consideration. The Chairman said the prosecution had proved their case, but there was something to be said for defendants. They might have believed that the first plan which was passed entitled them to proceed. They were wrong; but the amount of the penalty would be measured very much by their idea as to whether the defendants were acting honestly or not. They thought if possible that the defendants might be wrong without wishing to be so. They convicted in each case, and fined the defendants in the mitigated penalty of 5*s.*, instead of 5*l.*, and costs, 7*s.* each in the one case, and 6*s.* 6*d.* in the other.

Legal Notes and Queries.

PRIVATE STREET IMPROVEMENTS.

'IN a private street (under notice from the local board to be put in order), A., B., and C. are owners, their premises having equal frontages. Adjoining the premises of A. and B. there is already a good kerb, channel, and footpath; but C. has no such footpath, and, under the notice of the board, has laid one. Sec. 150 of the Public Health Act says, "The expenses incurred must be apportioned upon the owners according to their respective frontages." In this case, will A., B., and C. be charged alike, although C. has had more work done than A. and B., or should credit be given to A. and B. for the value of the footpath belonging to them? Of course, there are other expenses, sewering, roadway, etc.'

[The question is one which we should have thought hardly needed an answer, seeing how often the point has been raised. It is perfectly clear law that the apportionment is only to be according to frontage when everybody's frontage has needed similar treatment. In the opposite state of things credit is to be given to those whose frontages have needed less outlay than their neighbours, and they are to be charged only for the work actually executed by the local authority.—ED.]

THE WATER SUPPLY OF LONDON.

AT a special meeting of the Metropolitan Board of Works to receive a report on the question of the board taking under their control the water-supply of the metropolis, purchasing the interest of the existing companies, and extending the works, it appeared that the committee considered it indispensable that the board should submit a perfect scheme to Parliament so as to include the purchase of the water companies and the providing of a pure supply of water for drinking purposes. They advised that separate bills should be prepared for those purposes, and had given instructions to the Parliamentary draughtsman to that effect. As regarded the new works, the committee drew attention to the estimates of the engineers, that by the execution of these operations, instead of the enlargement of the existing undertakings, which would otherwise become necessary, an annual saving of 112,250*l.* would be effected. The report was adopted by a considerable majority.

'TOWN' *v.* 'COUNTRY' AT TIVERTON.

AN inspector of the Local Government Board has held an inquiry at Tiverton with regard to a memorial signed by ratepayers residing in the country portion of the parish, asking that the expenses incurred by the Town Council under section 208 of the Public Health Act, 1875, might be defrayed out of a district fund and a general district rate. The Town Clerk explained that the parish was about 17,650 acres in extent, that its rateable value was about 42,892*l.*, and that the country ratepayers were paying about equal with those residing in the town. If the prayer of the memorialists were granted, the country ratepayers would cease to enjoy the privilege of voting at

municipal or parliamentary elections, and he suggested, on behalf of the Council, that if the Local Government Board thought that there ought to be an alteration in the rating of the parish the old half-mile radius should be extended to a mile, and the rating should include all land except fields and orchards. Another suggestion from the Council was that the rates should be raised within the half-mile radius for sanitary purposes, and that the highways should be excluded, but not the fields and orchards. Mr. Daw, for the memorialists, stated that since the country had been rated with the town the rates of the country residents had increased 60 per cent. As to being represented in the Council, his clients did not trouble much whether they lost that privilege, as there were only three country representatives against eighteen returned by the town, and consequently the town representatives had matters all their own way. Mr. Loosemoore handed to the inspector a written protest against the Town Council levying rates beyond the half-mile radius, while the local Acts of the Improvement Commissioners were still unrepealed. The inspector promised to bring the matter before the Local Government Board.

BILLS FOR NEXT SESSION.

THE Metropolitan Board of Works intend to promote a bill to enable them to construct works for the supply of water to the metropolis, to give them special powers as to the laying of pipes, for the compulsory purchase of land, etc., levying of rates, borrowing of money, and amendment of existing Acts. The details of the scheme have already been made public in reports of the recent meeting of the board, at which it was submitted and adopted. The Board also intend to apply for leave to bring in a bill to enable them to acquire Plumstead Common and Shoulder of Mutton Green, Plumstead, and to provide for their maintenance for the use of the public. The Commissioners of Works and Public Buildings will apply for powers to acquire all the lands, buildings, etc., in the parish of St. Margaret, Westminster, within the area bounded on the north by Charles Street and that portion of Parliament Street which was formerly Upper Charles Street; on the south by Great George Street; on the east by Parliament Street, and on the west by St. James's Park, for a site to enable them to effect the concentration of the public offices. They will also promote a bill to empower them to acquire certain properties in and near Bow Street for the Construction of the new Bow Street Police Court. The South London (Spring) Water Bill is intended to enable a company to utilise the pure spring water at Tooting for the supply of the inhabitants of Wimbledon, Richmond, Croydon, Kingston, Lewisham, Streatham, Camberwell, Tooting, Lamerton, and neighbourhood, and to empower them to make arrangements or amalgamate with other companies.

PROPOSED NEW METROPOLITAN BUILDING ACT.

THE Metropolitan Board of Works has given notice of its intention to apply for leave to bring in a bill next session to amend and enlarge some of the powers and provisions of the Metropolis Management Acts, so as to enable the board to make further regulations, and to impose new restrictions with respect to the erection or alteration of houses and buildings, and particularly with respect to the distances at which such structures and the premises connected therewith shall be from the centre of any carriage or footway upon or near to which such properties shall, for the time being, be situated; to prevent the use for carriage traffic of roads of less width than 40 ft. where there are houses on each side of the road, or of less width than 20 ft. where there are only houses on one side; to authorise the board to make and enforce by-laws—(1) as to the foundations and sites of houses and buildings, and the mode in and the materials with which such foundations shall be made, and the sites be prepared and completed; (2) as to the description and quality of the substances of which the walls shall be made; (3) the powers and duties of and fees payable to district surveyors; to enlarge the powers of the board as to the removal of dangerous structures, and to provide for the recovery of the expenses incurred by them in respect thereof; to authorise district surveyors to enter and inspect houses, buildings, and works in course of construction; to confer upon the board powers over and with respect to theatres, music-halls, and other like places of entertainment, and to enable the board from time to time to make and enforce all such rules, regulations, orders, alterations, and restrictions as they may deem necessary or expedient in relation to such buildings for securing the public safety and convenience.

Review.

Sanitary Engineering. By J. BAILEY DENTON, C.E. London and New York: E. and F. N. Spon, 1877.

[*Second Notice.*]

MR. BAILEY DENTON'S work very wisely commences with a dissertation upon 'Air,' in which are considered the constituents of normal air, the attainable standards of purity, the quantity respired, the foreign matters which contaminate it, the measure of such impurity as furnished by the formation of carbonic acid, and the agencies which are known to counteract its pollution. Under all these heads a considerable amount of information—useful both to the general and particular student—has been given, and the whole is supplemented by some useful communications concerning oxygen, carbonic acid, ground air, and malaria. One of the most important paragraphs under this section is headed 'The duty of the Engineer in relation to Air,' and we cannot do better than quote the author's own words. It will be seen that he is a strong advocate for the draining of the foundations of houses, a matter to which we alluded in some detail in the SANITARY RECORD of July 18 and Aug. 22, 1874. Mr. Denton proceeds:

'By appropriate drainage of the ground forming the sites of dwellings, and of towns and villages (which are the congregation of dwellings) not only may the soil be made absorbent of liquid-filth, and capable by its aëration of oxidising the nitrogenous matter which it absorbs, but by the adoption of adequate depth of drains the uprising of polluted liquid in the soil, and the consequent evolution of pernicious gases rising by evaporation into the air, and permeating the basements of dwellings, may be prevented. Moreover, I believe that as these points are established and drainage is adopted we shall go further and acknowledge a sensibly improved temperature of the air as an unmistakeable consequence of under-draining the sites of dwellings. If I am right in these views, one of the first duties of the engineer, when carrying out sanitary works, is to render the ground upon which any dwellings stand free from subsoil water to within a recognised depth of their foundations. It is only by such means that the ground is made capable of supporting the incumbent outer air in such a state of purity (as indicated by the amount of carbonic acid it contains) that it shall always be available for the dilution of the air within dwellings.

'Perhaps the most fruitful source of impurity of air in dwellings is the damp condition of the ground immediately beneath and adjacent to them, which often becomes saturated with liquid filth by the too frequent practice of throwing the slops of the dwelling upon the surface of yards and gardens, or—what produces nearly as bad a condition—by heaping upon it solid house refuse of all sorts to be washed into the soil by the rainfall, and to give off effluvia from their accumulated heaps, or to spread their minute particles in the air and be taken into the lungs by respiration.

'It is when such a state of things exists that malaria

may be said to surround the dwelling, and render the outer air unfit for the dilution of the inner air. The malaria which prevails in certain countries can hardly be dissimilar in some respects to the air which exists over "excrement-sodden" ground and refuse-covered yards, though the effect may be worse in a hot than in a moderately cool climate like our own. In both, the absence of under-drainage is the primary cause of evil, and, in both, a soil aërated by under-drainage would to a certain extent oxidise the organic matters it contains, and greatly prevent the generation of miasma.'

Following immediately upon the foregoing, the author proceeds to point out the benefits which have been found to accrue from well-drained subsoils, instancing the disappearance of phthisis, as vouched for by the highest medical and other authorities. And here Mr. Denton is anxious to indicate that although this amelioration of consumptive disease arose in the first place from the laying down of sewers which drained at the same time the water sodden earth, it would be decidedly improper to expect sewers always to act in this beneficent manner, inasmuch as the same interstices which allowed the water to flow into the sewer would infallibly permit the sewage to saturate the soil with its filth whenever the pressure from within exceeded that which was without. He therefore contends that subsoil drainage should be achieved by means of separate 'under-drains' altogether independent of the sewers, or if connected with them, then only at places where the drained off water could be intermittently used for flushing purposes.

One most interesting sub-chapter on this section is that which treats of the improved temperature of the atmosphere which invariably follows the drainage of the subsoil. It appears that the temperature of drained soil has been raised in summer, above that of water-ridden soil to the extent of two and even three degrees, and that the advantage derived has been in many cases the same as if the land had been transported 100 or 150 miles southward. This is not a mere dictum of the author for he has fortified his opinion by appropriate quotations from various philosophers, which greatly benefit the reader. The author winds up this portion of his subject by quoting from Dr. de Chaumont how long-continued exposure to bad air tends in various ways to the production of scrofula and consumption, enteric fevers, disease of the respiratory organs, and how it accelerates the fatal march of small-pox, measles, and scarlet fever, besides retarding the cure of wounds and sores. The whole section is a most interesting one, and ably treated, and the author concludes with an apology for having rested so long upon that part of the question, which treats of subsoil dryness and the aeration of the land, which we are certain none of our readers will deem necessary. He says:

'I should not have laid so much stress upon under-drainage, in contradistinction and in addition to sewerage, as the work of the engineer, were it not that I am convinced that the present generation—which has adopted as an axiom the saying of Franklin, that "public health is a nation's wealth"—will be reproved by the next for not making the drying of the soil a fundamental requirement in sanitary works. I feel assured, that as certainly as we of this generation are now engaged in removing from our rivers the polluting matters which the authorities of the last obliged our fathers to discharge into them, so will those who come after us lament with shame, and do their best to repair, the disregard paid by our present authorities to the drying of the sites of habitations as one of the first considerations for the preservation of human life.'

As we intend to consider in our third notice the important question of water-supply, so exhaustively treated by our author, we will now shortly allude to the third division of the work before us, which refers entirely to the house or dwelling. Here the reader will find another mine of information regarding the capacity of various soils for the retention of water, and the evil influence of wet sites upon habitations. The necessity of concrete floors and damp courses are also as a matter of necessity brought up, and so also is the advantage which follows the introduction of proper areas around the exterior walls. Following all this useful information is a detailed account of the best means of treating sewage, of collecting liquid refuse, and of regulating its distribution upon the lands surrounding isolated dwellings. The ventilating and flushing of the drains and sewers, the arrangement and ventilating of water-closets, the disconnection of sinks, etc., from the drains, and the scavenging of dry closets, are also fully entered upon, and no essential recommendation appears to have been omitted. All this is now more or less well known, but here perhaps we have the fullest information and the most numerous collection of engravings explanatory of the text. We quote, by way of conclusion, a portion of the author's postscript, or appendix to this part of his work, with every word of which we most cordially agree:

'Still I venture to state that it is only necessary that those who do so occupy houses should examine for themselves—(1) the state of the domestic offices, and the attics serving as dormitories—(2) the condition of the wells, tanks, and cisterns from which the water used for drinking and household purposes is daily drawn—(3) the way in which gases, more or less deleterious, find access by unventilated soil pipes and sink pipes from sewers and cesspits, into the rooms and passages frequented by themselves as well as their servants; and, further, that they should know the condition of the ground surrounding their dwellings, which is often kept saturated with sewage from leaky sewers mixed with roof waters, carried by down pipes into those sewers to satisfy them that there exists a very different state of things from that which they have been led to believe is the case. Up to this time the warnings of medical authorities have hardly reached them, or those warnings have been evaded under the impression that the country house, being surrounded by a pure atmosphere, is proof against air pollution, and that, because they are isolated, the water drawn from shallow wells, sunk in close proximity to their dwellings, must necessarily be as pure as the air.

'Surely there can be no greater mistake than this assumption. In the basements of many of the largest country mansions occupied by the most wealthy of our landowners, cesspools and sewers exist in number sufficient to render the superincumbent atmosphere extremely unwholesome. In a majority of instances it will be found that the water used for drinking, cooking, and washing, will be obtained from wells in the neighbourhood of putrefying matter collected in cesspits and out-offices, or within reach of polluting liquid escaping from sewers and drains. Failing defilement before it is delivered into the dwelling, the water used will still be found to be more or less defiled by the foul condition of the service-cisterns within the dwelling, which, perhaps, have not been emptied nor cleansed for five years, and which may, therefore, contain matter of a pernicious character.

'Under any circumstances it will generally be found that there is an absence of proper filtration of water used for domestic purposes, and that the water-closets and the kitchen boiler are directly supplied with water from the same cistern, and that, from a want of proper ventilation of soil pipes and closets—particularly where the latter exist in connection with sleeping apartments—the internal atmosphere of a country house may be rendered even more unwholesome than a town house, owing to the fact that in large country houses the principal bedrooms are only occasionally occupied, when the detention of putrefying matter in the traps of soil pipes increases the probability of sewer malaria.'

THE death-rate recorded in London last week was 23·2, which is the highest since May last.

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

MARLBOROUGH HOUSE.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Since I wrote my last letter under the heading of 'Lodging-houses and Local Boards' a letter has been sent to the *Times* by Dr. Lawrence Hamilton, which shows me that I was wrong in assuming that Marlborough House drained into Pall Mall.

The fact does not alter my argument, which was that whether the sewer runs down Pall Mall or St. James's Park every house drain should be trapped and ventilated before it reaches the sewer. I should like to add a few words with reference to this letter written by Dr. Lawrence Hamilton. He says that the building was altered and improved before H.R.H. the Prince of Wales ever took up his residence there; and yet he adds that 'since the recent outbreak of fever other basement walls, cesspools, and drains exist which have no reference to the drains proper of Marlborough House.' Why was not all this found out at the first 'examination and report?'

He mentions that 'an iron gate' was placed on the St. James's Park side of the sewer to prevent the wind ascending from the sewer to the house; as it is to be presumed that this iron door must open to let out the sewage, it must allow ingress to the foul air at the same time while it is open.

At the end of the letter we are told that 'the stack or water-closet pipes are to be renewed, their upper ends being caried above the roof, and left open for ventilation, in other words the soil-pipes in Marlborough House are to be ventilated. In the name of common sense why was this not done before? The most simple, common precaution taken in some towns in all second-rate houses, is now in 1877, or perhaps in 1878, to be applied to a Royal Palace!

How about the sinks from the sculleries and from the housemaids' closets? Such a deal is made out of the ventilation of the soil-pipes in this letter, that I am afraid these other very important matters will be overlooked.

The most promising feature in this letter is the last line or two: 'while the house itself is to be effectually isolated from the main drains by ventilation.' If this is really done, and well done, it will be merely carrying out the principles which I have so strongly urged, namely, of ventilation.

If by ventilation Marlborough House can be effectually isolated from the main drains, it stands to reason that every other house, either in Pall Mall or in Carlton Gardens, can be also 'effectually isolated;' and as a natural consequence the main drain itself, although containing a certain amount of impure air, would never be able to 'bottle it up;' and so to generate sewer gas. J. R. T.

[For an account of the sanitary work actually in progress at Marlborough House J. R. T. is referred to page 344.—ED.]

WATER ANALYSIS.

(*To the Editor of the* SANITARY RECORD.)

SIR,—The letter signed 'Aquaregia' scarcely needs a word from me. It is sufficient that by the publication of my analysis of the Accrington water such a 'scare' has been raised that Dr. Angus Smith has been called in to investigate the matter.

Your correspondent 'Ariston Men Udor' certainly asks pertinent questions, to which he has a right to straightforward replies.

1. I think it is quite correct to add together nitrogen as ammonia, nitrogen as albuminoid ammonia, nitrogen as nitrates, and nitrogen as nitrites, because when I have done so I call the result 'total nitrogen in these four forms,' and as such it is a valuable factor in judging of the results of the analysis. I cannot understand the latter part of the question. Of course I do not estimate the nitrates and nitrites in the residue left after distillation; on the contrary, an independent portion of the water is taken for each of these purposes. My estimations of nitrogen are not too high but too low, for some of the combined nitrogen escapes estimation by any one of these four determinations; this is my reason for using the phrase 'in these four forms.'

2. Excremental products certainly cannot be separated and estimated as such. I don't think I really understand the meaning of 'Ariston Men Udor's' question.

3. I have cultivated my sense of smell by practice, but it is not that specially which enables me to diagnose the character of the contamination; on the contrary, I owe my success in this respect to a very neat little device which I believe was first introduced by Mr. Crookes. It is as follows: Take two or three ounces of the water, the smell of which is to be tested, and warm it carefully and quickly in a flask to a temperature of about 102° or 104° Fahr., say 4° or 6° above blood heat; then take a glass tube of about ⅜-inch diameter and 3 feet long, put the flask containing the water on the floor, carefully suck up the water five or six times into this tube until the inside of the tube is thoroughly wetted with the water, then allow the water to escape, and closing one nostril with the finger take two or three full inspirations through the tube with the other nostril. If 'Ariston Men Udor' will carry this out carefully and practice it a few times, he will find that it is very easy to ascertain, as far as smell is concerned, which is the best water.

4. I am obliged to 'Ariston Men Udor' for calling my attention to this. Either by a slip of the pen or a printer's error, there is a mistake in my reply to Dr. Parson's letter. I meant to have said that distilling water 'does not decompose urea *into ammonia*.' The two words in italics were omitted, but the context shows that their omission does not interfere with the argument of my letter. Your correspondent is mistaken as to the products produced by urea during distillation. He cites Wanklyn, Francis, and Fox in opposition to me. I need do no more than refer him to the first. In 'Water Analysis' by J. A. Wanklyn, 1876, p. 117, I find the following: 'In presence of permanganate and excess of potash, urea is doubtless decomposed but it yields no ammonia.' This is no new fact, but one which has been known to chemists for years.

5. I have tried the numbered glass coloured discs and the graduated glass colour scale, but personally I prefer the colorimeter. This however is not a matter upon which an authoritative opinion can be expressed, because it depends upon the idiosyncrasies of a man's vision. I must leave 'Ariston Men Udor' to choose that method which suits his eyes best.

I know my processes are more involved than those ordinarily used, but so long as the results are commensurate with the labour spent on them where is the harm?

In reply to Dr. Fussell's letter the only point to which I need refer is that he says that he never attempts to close a well, except in urgent cases, until the inspector has failed in detecting the source of its impurity. I would ask whether he does not consider that Mr. Wynter's well at Seaford—my unfiltered sample from which 'swarmed with living animalculæ and contained decomposing animal remains'—and the S. well—my sample from which had an unmistakeable taste and smell of fæces—are cases sufficiently urgent to induce him to put his inspector in motion to find out the source of the impurity if it can be detected? In my opinion they are not only sufficient for this, but for Dr. Fussell without waiting for any inspector's action, to take proceedings to summarily close these wells, even though the scarcity of water in some of his districts might become worse than he says it is now. I agree that the closing of a well is no light matter, but allowing polluted ones to remain open is not a responsibility which would be incurred, if he had the power to prevent it, by G. W. WIGNER.

79, Great Tower Street, E.C.

VENTILATING COWLS.

(*To the Editor of the* SANITARY RECORD.)

SIR,—In reply to Mr. Dobson's inquiry I must first state that I have never used Kite's ventilator. The principle upon which it acts is the same as Boyle's, but the arrangement of deflecting plates is very different.

Speaking theoretically, I should say that Kite's might answer if the wind would always blow in the direction of the arrows in the woodcut Mr. Dobson alludes to; but I can imagine and should expect a reverse action (down draught) should the wind blow in the opposite direction. An examination of the section of Boyle's will show that whatever may be the direction of the wind the effect must necessarily be the same. ERNEST TURNER.

44, Bedford Row, W.C.
November 26, 1877.

Notice of Meeting.

MANCHESTER AND SALFORD SANITARY ASSOCIATION.

A SERIES of health lectures for the people will be elivered in the Association Hall, Peter Street, as follows: December 18. 'Clothing in Relation to Health,' by John Haddon, M.A., M.D.; January 15. 'A Healthy Skin,' by W. J. Sinclair, M.A., M.D.; February 12. 'The Dwelling-House in Relation to Health,' by Henry Simpson, M.D.; March 5. 'Why little Children Die,' by H. H. Vernon, M.D., Medical Officer of Health, Southport; March 26. 'Our Food, and how it is adulterated' (illustrated), by C. Estcourt, Esq., F.C.S., Public Analyst for the City of Manchester. A lecture on 'Pure Air, and its Influence upon Health,' by Arthur Ransome, M.A., M.D., was delivered at the opening of the course on the 28th inst.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

CAMERON, Mr. John, has been appointed Surveyor and Inspector of Nuisances to the Prescot Local Board and Urban Sanitary Authority, Lancashire, vice Smith, resigned.

EMMERSON, John Bolton, M.B. Univ. Durh., M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the Willington-Quay Urban Sanitary District, Northumberland, vice Hadfield, deceased.

HADEN, Mr. H. H., has been appointed Collector to the Abersychan Local Board and Urban Sanitary Authority, Monmouthshire.

JACKSON, Joseph, L.R.C.P. Edin., and L.M., L.R.C.S. Edin., has been re-appointed Medical Officer of Health for the Denholme-Gate Urban Sanitary District, Yorkshire, at 75*l.* per ann., for three years.

JONES, Mr. John, has been appointed Surveyor and Inspector of Nuisances and Collector to the Huyton-with-Roby Local Board and Urban Sanitary Authority, Lancashire.

WAINWRIGHT, Mr. J. H., has been appointed Clerk to the Abersychan Local Board and Urban Sanitary Authority, Monmouthshire.

VACANCIES.

ABERTILLERY URBAN SANITARY DISTRICT. Inspector of Nuisances and Collector. Application, stating the salary required, to John E. Ward, Clerk to the Authority, Victoria Chambers, Newport, Monmouthshire.

ALTRINCHAM, CONGLETON, AND NANTWICH RURAL, AND LYMM, MIDDLEWICH, SANDBACH, AND WINSFORD URBAN SANITARY DISTRICTS. Medical Officer of Health: 800*l.* per ann. for three years.

ANDOVER, CORPORATION OF, AND URBAN SANITARY AUTHORITY. Surveyor, Inspector of Nuisances, and School Attendance Officer: 140*l.* per ann. Application, to R. Footner, Town Clerk.

ATCHAM RURAL SANITARY DISTRICT, Suffolk. Inspector of Nuisances.

BECCLES, CORPORATION OF, AND URBAN SANITARY AUTHORITY. Surveyor.

BINGLEY IMPROVEMENT COMMISSIONERS AND URBAN SANITARY AUTHORITY, Yorkshire. Surveyor.

CANTERBURY, CITY AND BOROUGH OF, AND URBAN SANITARY DISTRICT. Inspector of Nuisances: 60*l.* per ann. Application, December 3, to Rest W. Flint, Town Clerk.

HAVANT GUARDIANS AND RURAL SANITARY AUTHORITY. Clerk.

HAWORTH, OAKWORTH, OXENHOPE, SILSDEN, AND SKIPTON, URBAN AND KEIGHLEY, SETTLE, AND SKIPTON RURAL SANITARY DISTRICTS, Yorkshire. Medical Officer of Health: 400*l.* per ann. for three years. Application to T. P. Brown, Solicitor, Clerk to the Committee, Skipton.

LODDON and CLAVERING RURAL SANITARY DISTRICT, Norfolk, Inspector of Nuisances: 40*l.* per ann. Application, December 1, to James Cole Copeman, Clerk to the Authority, Loddon, Norwich.

NEW-QUAY URBAN SANITARY DISTRICT, Cardiganshire. Medical Officer of Health, Inspector of Nuisances. Application, December 3, to Thomas Lloyd, Clerk to the Authority.

WIRKSWORTH LOCAL BOARD AND URBAN SANITARY AUTHORITY, Derbyshire. Medical Officer of Health: 15*l.* per ann. Surveyor: 20*l.* per ann. Inspector of Nuisances: 20*l* per ann. Application, December 1, to J. F. Kingdon, Clerk.

THE INSTITUTION OF CIVIL ENGINEERS.

SUBJECTS FOR PAPERS.

Session 1877–78.

THE Council of the Institution of Civil Engineers invite communications, of a complete and comprehensive character, on the following subjects interesting to sanitary engineers, as well as on other engineering questions. For approved original communications, the council will be prepared to award premiums, arising out of special funds bequeathed for the purpose. The council will not, in any case, make an award unless a communication of adequate merit is received: but, on the other hand, more than one premium will be given, if there are several deserving memoirs on the same subject. In the adjudication of the premiums no distinction will be made between essays received from a member, an associate, or a student of the institution (except in the cases of the Miller and the Howard bequests, which are limited by the donors), or from any other person, whether a native or a foreigner:—1. The construction of warehouses and of other buildings to resist fire, and the relative merits of stone, brick, iron, and timber for that object; 2. The warming and ventilation of large buildings; 3. The different systems of road-making best adapted for large towns, or where the traffic is heavy, including a comparison of first cost, maintenance, and durability; 4. The design and construction of masonry dams of great height for retaining water in reservoirs; 5. The storage and filtration of water, both natural and artificial; 6. The constant service of water-supply, with special reference to its introduction into the metropolis, in substitution for the intermittent system; 7. The systems of domestic water-supply suitable for rainless districts; 8. The lighting of railway carriages; 9. The various descriptions of pumps employed for raising water or sewage, and their relative efficiency.

Instructions for Preparing Communications.

The Communications should be written in the impersonal pronoun, and be legibly transcribed on foolscap paper, on the one side only, leaving a sufficient margin on the left side, in order that the sheets may be bound. Every Paper must be prefaced by a concise Abstract. All Communications should be accompanied with a set of drawings on tracing paper, to as small a scale as is consistent with distinctness, and ready to be engraved. If accepted for reading, then there will be required a series of Diagrams (which will be returned), sufficiently large and boldly coloured, so as to be clearly visible when suspended in the Theatre of the Institution. Papers which have been read at the Meetings of other Societies, or have been published in any form, cannot be read at a Meeting of the Institution, nor be admitted to competition for the Premiums. The Communications must be forwarded to the house of the Institution, where any further information may be obtained.

PREMIUMS AWARDED.

Session 1877–78.

The Council of the Institution of Civil Engineers have awarded the Manby Premium to Charles Norman Bazalgette, Barrister-at-Law, for his Paper on the 'Sewage Question.'

CHARLES MANBY, Honorary Secretary.
JAMES FORREST, Secretary.

The Institution of Civil Engineers,
25 Great George Street, Westminster, London, S.W.

NOTICE.

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Original Papers.

ON THE WATER-SUPPLY OF SEASIDE WATERING-PLACES.

BY G. W. WIGNER, F.C.S.

(*Continued from p.* 344.)

BEFORE reporting on the next place I must once again refer to Hunstanton, on the Norfolk coast, the place from which I first started, and to which I have already twice referred.*

Mr. J. H. Scott Darbin now writes, repeating and somewhat amplifying the objections which Mr. Valentine, the engineer of the Water Company, urged, and to which I have already replied. Mr. Darbin says he has no interest in the company, but his information is derived from 'a most intelligent respectable person,' 'officer in charge of the waterworks at Hunstanton,' and it happens that my information was derived from the same person, and was taken down from his own words by one of my assistants, a shorthand writer of many years' experience. As, therefore, I went to the 'officer in charge' for information, and even then acknowledged it only as 'it is said' and 'it is reported,' I say unhesitatingly that as the engineer would not reply to my queries I took the next best step to procure information, and am fully justified in my remarks.

However, I give Mr. Darbin's corrections, though they do not seem of importance. I said the well was fourteen miles from the sea. This is a clerical error; it should have been ¼ mile—the stroke was omitted. I called the well '*A* chalk well,' Mr. Darbin says it is called '*The* chalk well,' but this name *he* states is a misnomer (although admittedly the one by which the well is known) and says that the source is really in the lower green sand. I can only state that in my opinion water with 16° of hardness before boiling, and 9° after boiling is much more likely to have come from the chalk than from the lower green sand.

Mr. Darbin also takes exception to my sample as having been drawn from a small tap in a small private house. I would merely remind him that such a sample, where there is no cistern and a constant service, is equally as fair as a specimen of the water-supply as a sample drawn under similar circumstances from a large tap in a large house, or even from a hydrant in the street; at any rate the inhabitants of the small house drink this water.

Mr. Darbin further asserts that my statement that the water was discoloured and required filtration is a 'very serious libel.' I repeat that my sample was discoloured, and showed that the water required filtration. I should not, under any circumstances, accept Mr. Darbin's offer to take me to the springs, because what I want is the supply, not the source, but if he will have a sample drawn from a main in his presence, and properly stoppered and sealed and sent to me, I shall be happy to see if the water has improved since the date of my previous examination, and will publish the results. Mr. Valentine has not accepted a similar challenge which I made when I replied to his objections, though nearly three months have elapsed. Perhaps Mr. Darbin will do so.

I will conclude this by saying that I am truly sorry to hear that 'the intelligent respectable official in charge of the water works' has any cause to feel (to quote Mr. Darbin's own words and emphasis) 'PRESENT great *regret*' for allowing my assistant to have a sample of water from his house. If correct, the statement tells its own tale.

* See SANITARY RECORD, No. 165, p. 117, and No. 168, p. 165.

BRIXHAM, the next place to which we come, has a resident population of about 5,000. Mr. Clarke, the surveyor, who kindly forwarded me a sample of the water, informs me that the supply is derived from a spring called Laywell, at Higher Brixham. The quantity of the supply is nearly 30 gallons per head per day, and it is constant. The water is not filtered. The sample I have analysed was drawn from the main by Mr. Clarke, on September 13 last, and gave the following results:

	Grains per gallon.
Total solid matter	25·41
Loss on ignition after deducting combined carbonic acid	6·50
Lead and copper—none.	
Iron—slight trace.	
Chlorine calculated as chloride of sodium	3·69
Hardness before boiling, 10·6° (Clark's scale)	
Hardness after boiling, 4·7° " "	
Nitrogen as ammonia	0·0056
" albuminoid ammonia	0·0039
" nitrates	0·1070
" nitrites	0·0050
Total nitrogen in these four forms	0·1215
Oxygen absorbed by organic matter	0·0540

The results of the microscopical examination were very satisfactory, and the water was free from smell and taste, but it contained much suspended matter, showing that, good as its general character is, filtration is essential. It is a pity that an otherwise good supply should be condemned for such a fault.

PAIGNTON, in Devonshire, has a population of about 4,000, and, unfortunately, although there is a water company who furnish a public supply, many of the inhabitants prefer the water they obtain from private wells. The company's supply is said to be derived from springs in limestone hills, to the south of the town, the water being collected in a service reservoir. My information does not enable me to state whether the supply is constant or not. My sample was drawn by my assistant from the main on October 8 last, and gave the following results:

	Grains per gallon.
Total solid matter	20·00
Loss on ignition after deducting combined carbonic acid	0·75
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	2·57
Hardness before boiling, 12·4° (Clark's scale)	
" after boiling, 3·2° " "	
Nitrogen as ammonia	0·0021
" albuminoid ammonia	0·0038
" nitrates	0·0700
" nitrites	traces
Total nitrogen in these four forms	0·0759
Oxygen absorbed by organic matter	0·0220

The water was free from smell and taste, and had a very satisfactory pale blue colour. The microscopical appearances were as good as could be wished. This is therefore a water-supply of excellent character—a thoroughly first-class water. I also had a

sample from a private well in the town, which is used by the visitors and residents at an hotel there. The following were the results :

	Grains per gallon.
Total solid matter	27·90
Loss on ignition after deducting combined carbonic acid	0·14
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	4·47
Hardness before boiling, 16·0° (Clark's scale)	
,, after boiling, 6·1° ,, ,,	
Nitrogen as ammonia	0·0060
,, albuminoid ammonia	0·0054
,, nitrates	0·4160
,, nitrites	0·0040
Total nitrogen in these four forms	0·4314
Oxygen absorbed by organic matter	0·0120

This water when examined by the microscope almost resembled the water of a stagnant ditch in its appearance ; it was full of bacteria and other forms of life, and contained many fragments of decomposing organic matter. It is a most unsatisfactory water, especially considering the excellent character of the town supply.

TORQUAY, which has a population of about 25,000, has a public supply, which is the property of and under the control of the Local Board. The supply is derived from springs, and it is to be regretted that at present it is only intermittent, and, if I am correctly informed, there is no supply at all on Sundays. The quantity pumped is said to equal from 20 to 25 gallons per head per day. The springs are reported to be in the granite formation, and the water deposits so much solid matter in the mains that they have to be scraped every three months. I have had four samples of this supply ; the first was drawn by an assistant from a main tap at the fire engine station, on October 8 last, and gave the following results :

	Grains per gallon.
Total solid matter	5·60
Loss on ignition after deducting combined carbonic acid	1·31
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	1·64
Hardness before boiling, 1·4° (Clark's scale)	
,, after boiling, 1·2° ,, ,,	
Nitrogen as ammonia	0·0088
,, albuminoid ammonia	0·0047
,, nitrates	0·0790
,, nitrites	0·0050
Total nitrogen in these four forms	0·0975
Oxygen absorbed by organic matter	0·1120

The microscope showed that the traces of suspended matter consisted almost entirely of decomposing leaves and vegetable fibres, and there is little doubt but that a slightly objectionable smell which the water had may be traced to the same source. The supply has the advantage of being very soft, but the nitrogenous constituents are not as low as I should have expected from a spring in the granite.

Mr. Little, the engineer of the water works, has forwarded me two other samples, one drawn from the service reservoir at Chapel Hill, and the other from the main as it flows into the Warberry Reservoir; both were drawn on or about October 24, say fourteen days later than the sample drawn by my assistant. The following were the results :

	Service Reservoir. Grains per gallon.	Warberry Reservoir. Grains per gallon.
Total solid matter	6·12	19·50
Loss on ignition after deducting combined carbonic acid	1·92	4·02
Lead and copper—none.		
Iron—traces.		
Chlorine calculated as chloride of sodium	2·00	1·76
Hardness before boiling, Service Reservoir, 1·9° ; Warberry Reservoir, 10·5° (Clark's scale)		
Hardness after boiling, Service, Reservoir, 1·9° ; Warberry Reservoir, 10·1° (Clark's scale)		
Nitrogen as ammonia	0·0118	0·0051
,, albuminoid ammonia	0·0102	0·0063
,, nitrates	0·0670	0·0650
,, nitrites	0·0030	0·0050
Total nitrogen in these four forms	0·0920	0·0814
Oxygen absorbed by organic matter.	0·0240	0·1640

Both samples showed some serious differences from that obtained by my assistant; indeed in the case of the Warberry Reservoir water the differences were so great that I have since made inquiries on the subject, and find that the exceptional impurity was probably due to a heavy rainfall which had just occurred. Taking them however in order, Mr. Little's sample from the Service Reservoir when compared with my assistant's sample showed an increase in total solids, volatile matter, hardness and salt, and the albuminoid ammonia was more than double. This increase in the albuminoid ammonia, if that alone were considered, would put it as a third class water, but the other results hardly justify such a strong condemnation. Mr. Little's sample from the Warberry Reservoir was entirely different in character. The hardness had increased from 1·4° to 10·5°, and the amount of oxygen absorbed was very heavy. The albuminoid ammonia although not so high as in the Service Reservoir sample, was still higher than it should be. The microscopical appearance of the sample was however much more satisfactory, and this confirms the suspicion that it is a different water.

On October 18 a resident at Torquay forwarded me a sample of water which he said was drawn from the Tottiford Reservoir, and this gave results slightly better than those shown by Mr. Little's sample from the Service Reservoir.

KINGSKERSWELL is a small place supplied only by private wells, and I believe it is not properly a watering place. I only had one sample, which I received on October 18 last, from a resident there, who sent it to me as a specimen of the supply. The following are the results :

	Grains per gallon.
Total solid matter	67·40
Loss on ignition after deducting combined carbonic acid	2·22
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	12·87
Hardness before boiling, 28·4° (Clark's scale)	
,, after boiling, 8·9° ,, ,,	
Nitrogen as ammonia	0·0057
,, albuminoid ammonia	0·0045
,, nitrates	1·6760
,, nitrites	0·0040
Total nitrogen in these four forms	1·6902
Oxygen absorbed by organic matter	0·0400

The water had a yellow colour; and when it was examined by the microscope, it was seen to be literally swarming with bacteria; several classes of diatoms were also present. The evaporated residue showed a large quantity of decomposing animal *débris*. On the whole, it is one of the most unsatisfactory samples in this third series, and the well should certainly be closed.

TEIGNMOUTH has a population of some 7,000. The waterworks are in the hands of the local board, who furnish the inhabitants with a constant supply during winter, but only an intermittent supply during the summer time, when the town is full of visitors; this is not as it should be. The supply is derived from springs in the green and red sandstones, and amounts to twenty-five gallons per head per day, but there appears to be at least three different sources, which differ considerably. There is a reserve reservoir for use in case of fire. I have received a copy of two analyses made in 1874 by a London analyst; but as they contain no determination of ammonia or nitrogenous constituents, I do not consider they are worth printing. The waters were also examined in 1875 at the Laboratory of the Rivers Pollution Commission, and I give below the figures obtained. I have translated the parts per 100,000 in which the analyses were expressed into grains per gallon, and the chlorine into chloride of sodium, so as to make the results more readily comparable with my own analyses:

Results of an Analysis by Professor Frankland.

Description	Total solid Impurity	Organic carbon	Organic nitrogen	Ammonia	Nitrogen as nitrates and nitrites	Total combined nitrogen	Previous sewage or animal contamination	Salt	Hardness			Remarks
									Temporary	Permanent	Total	
TEIGNMOUTH:												
Coombe Well	28·000	·0392	·0056	·0007	·3710	·3773	3493·0	3·71	11·4	11·1	22·5	Slightly turbid
Water entering higher reservoir	16·240	·0196	·0049	·0007	·3675	·3731	3458·0	3·31	2·0	7·6	9·6	Clear
Water entering lower reservoir	15·750	·1120	·0147	·0007	·0448	·0602	231·0	2·75	7·2	6·3	13·5	Slightly turbid

I have had two samples of the supply—one was drawn by an assistant on October 6, and the other was forwarded to me by Mr. Turner, the surveyor, on October 18. I place the results side by side:

	Oct. 6. Grains per gallon.	Oct. 18. Grains per gallon.
Total solid matter	20·90	22·60
Loss on ignition after deducting combined carbonic acid	1·39	1·85
Lead and copper—none.		
Iron—traces.		
Chlorine calculated as chloride of sodium	3·39	3·74
Hardness before boiling, Oct. 6, 9·6°; Oct. 18, 11·5° (Clark's scale)		
Hardness after boiling, Oct. 6, 1·4°; Oct. 18, 2·6° (Clark's scale)		
Nitrogen as ammonia	0·0036	0·0046
,, albuminoid ammonia	0·0031	0·0047
,, nitrates	0·1080	0·1220
,, nitrites	0·0040	0·0040
Total nitrogen in these four forms	0·1187	0·1353
Oxygen absorbed by organic matter	0·0380	0·0320

As regards total solids and mineral constituents, my samples do not differ very greatly from Dr. Frankland's. It is, of course, impossible to compare the organic nitrogen, but it will appear that the nitrates appear to have sensibly decreased. The colour, taste, and smell of both samples were satisfactory. The microscopical appearance of my own sample was good, but I found a few bacteria in the sample forwarded by the surveyor. These must certainly be classed as good waters. Dr. Frankland's figures in 1874 would show them to be some three times as impure as that which the New River Company supplied to London at that date, but my results in October last are certainly relatively better.

DAWLISH is a smaller place, the population not exceeding 4 000 or 5,000. It has no public supply; the inhabitants derive their water entirely from private wells. My assistant obtained two samples as specimens—one from an hotel, and the other from a druggist's house. The following were the results:

	Hotel Well. Grains per gallon.	Druggist's Well. Grains per gallon.
Total solid matter	34·20	30·80
Loss on ignition after deducting combined carbonic acid	4·64	4·76
Lead and copper—none.		
Iron—traces.		
Chlorine calculated as chloride of sodium	8·85	7·60
Hardness before boiling, Hotel Well, 8·3°; Druggist's Well, 8·2° (Clark's scale)		
Hardness after boiling, Hotel Well, 6·8°; Druggist's Well, 7·2° (Clark's scale)		
Nitrogen as ammonia	0·0161	0·0049
,, albuminoid ammonia	0·0033	0·0028
,, nitrates	0·5830	0·7660
,, nitrites	0·0050	0·0040
Total nitrogen in these four forms	0·6074	0·7777
Oxygen absorbed by organic matter	0·0160	0·0160

The samples were drawn from places at a considerable distance apart, but yet as will be seen, there is such a degree of accordance in the results as to render it probable that both samples really represent the character of the water in the water-bearing strata under Dawlish. The samples were free from smell, but the hotel one had a slightly objectionable taste. The albuminoid ammonia was low in both cases, but the nitrates were high, while the results of the microscopical examination were very unsatisfactory, evidently showing animal contamination. It is not possible to rank these higher than as third class waters.

EXMOUTH has a population of about 5,000 or 6,000, and is supplied with water by a company who are said to draw their water from springs in the gravel at Squagmoor on Black Hill. The supply is intermittent and is said to be cut off entirely on

Thursdays. My assistant drew a sample from the mains on October 6, last, which gave the following results :—

	Grains per gallon.
Total solid matter	8·80
Loss on ignition after deducting combined carbonic acid	2·40
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	3·51
Hardness before boiling, 2·7° (Clark's scale)	
,, after boiling, 2·7° ,, ,,	
Nitrogen as ammonia	0·0022
,, albuminoid ammonia	0·0021
,, nitrates	0·1820
,, nitrites	traces
Total nitrogen in these four forms	0·1863
Oxygen absorbed by organic matter	0·0260

The sample had a satisfactory colour, smell, and taste, and the microscopical appearance was very good. It is a first class water..

SIDMOUTH is another small place with a population of about 4,000 or 5,000. A large proportion of the water which is used is collected from springs in a sandstone hill in the grounds of the Lord of the Manor, but there are private wells in addition. I am not able to give an analysis of the water from any of the private wells, but the semi-public supply gave the following results :—

	Grains per gallon.
Total solid matter	28·60
Loss on ignition after deducting combined carbonic acid	2·58
Lead and copper—none.	
Iron—traces.	
Chlorine, calculated as chloride of sodium.	4·91
Hardness before boiling, 10·8° (Clark's scale)	
,, after boiling, 7·8° ,, ,,	
Nitrogen as ammonia	0·0046
,, albuminoid ammonia	0·0029
,, nitrates	0·1650
,, nitrites	0·0030
Total nitrogen in these four forms	0·1755
Oxygen absorbed by organic matter	traces

The water had a good colour and was free from smell; the microscope showed a few bacteria, but no other contamination. It is a fairly good water.

I shall refer next week to the supplies at Seaton, Weymouth, Lymington, Gosport, Portsmouth, and one or two places missed from their proper order.

BREAD AND BREAD STUFFS.

BY BERNARD DYER, F.C.S., Member of the Society of Public Analysts.

I.

THE primary importance of bread in the dietary of the human race is sufficiently conceded by its universal acceptance as a symbolical type of the whole category of our temporal wants; hence no apology is due to the reader for the introduction of this subject into the columns of a journal devoted to the consideration of matters of health.

The many constituents entering into the composition of the numerous articles consumed as food in the animal kingdom are, by general consent, classed into five divisions:

1. Nitrogenous organic matter, contributing to the formation and repair of lean muscle or flesh, properly so called.

2. Carbonaceous matter, such as oil and other fats, starch, sugar, dextrine, gum, and mucilage, whose functions in the animal economy are the direct or indirect support of the respiratory process, with the consequent production of heat. These materials, or most of them, are also the active agents in the formation of fat; but since the true object of the formation of fat in the animal system appears to be but the storing up of a reservoir of temporarily superfluous material for future oxidation in failure of the usual food supply, this also may be looked upon as an indirect contribution towards the maintenance of respiratory action.

3. Mineral matters, necessary for the formation of bone, and for furnishing the saline constituents of the various juices and tissues of the body.

4. Indigestible matters, performing no functions save those of diluents of the otherwise too concentrated nutritious substances.

5. Active or passive principles, such as alcohol, essential oils, flavouring-matters, alkaloids, glucosides, etc., sometimes of medicinal or stimulating properties, but not directly valuable—or else of questionable value—as food, in the usually recognised acceptation of the term.

The richest source from which we derive the nitrogenous portion of our diet is, of course, flesh-meat itself; but, owing to the high price of this luxury, there are many thousands of the poorer working classes who seldom, comparatively speaking, have a chance of tasting it, their principal subsistence being bread, butter, and vegetables, with the occasional addition of a little cheese. The bulk of their nutriment has therefore to be supplied by the baker, and it is fortunate that bread should happen to contain in itself a supply of the various materials necessary for the support of life.

In the strict sense of the term, the name 'bread' may be extended to all substances prepared by baking the kneaded dough or paste made by mixing water with the meal of any cereal grain, including unfermented, unleavened, or non-aërated bread. In its conventional application, however, the name bread is usually restricted to the baked fermented or aërated dough of wheaten flour. The composition and nutritive properties of wheat, therefore, claim our first attention, after which we shall say a few words about oats, rye, barley, maize, and rice, and the meals which they respectively yield in the hands of the miller. The grain of—

Wheat is derived from certain varieties of the genus *Triticum*, the botanical relationship of which, further than its place in the natural order *Gramineæ*, we need not at present discuss. When ground and sifted it furnishes us with a series of substances varying in fineness from the best white flour to the coarsest bran or pollard, and known commercially as 'firsts,' 'seconds,' 'fine middlings,' 'coarse middlings,' 'twenty penny,' 'bran,' etc. The chemical composition and relative proportion of these various materials differ somewhat according to the treatment (moistening, etc.) of the grain before its introduction into the mill, the fineness of the mill-stones, the force by which they are turned, the number and relative fineness of the sieves used for separating the various portions, and other practical considerations which will obviously suggest themselves. The variation in their composition and consequent nutritive value is, however, as

we shall presently see, a matter of no little importance.

The whole grain of wheat contains more nitrogenous or real flesh-forming matter than any other of the cereals, the proportion occasionally reaching as high a figure as 22 per cent., mainly consisting of a tenacious, pasty principle called gluten, together with a little 'vegetable albumen.' Since, however, the greater portion of this nitrogenous matter is situated in the outer part of the grain immediately bordering upon the skin or integument, much of it is necessarily eliminated with the bran, the general result being that the finer the flour, the less the proportion of true flesh-forming matter contained therein. The same remarks apply to the natural fatty matter or oil of the wheat, which is chiefly concentrated in cells in the outer part of the grain. Thus, while fine flour rarely contains much more than 1 per cent. of fat, bran is not unfrequently found to contain 3 to 4 per cent., or even more. The mineral matter of wheat, again, is chiefly concentrated in or near the integument, and is consequently lost to the consumer of fine flour only. The latter, which is composed largely of starch, is readily digestible, thus possessing, it must be admitted, a certain advantage over the coarser kinds, which contain more or less an admixture of fine bran, and which, though intrinsically of considerably greater nutritive value, are, nevertheless, owing to their larger proportion of cellular fibre and gluten, less adapted to the requirements of persons of delicate digestion. It must not, of course, be supposed that anything like the whole of the gluten and albumen of wheat is removed with the bran, since a sufficient quantity remains in the flour to render the latter, in the form of bread, capable of supporting life. Seeing, nevertheless, that white wheaten bread has lost a large proportion of its natural gluten, it must be regarded, despite its digestibility, as decidedly less nutritious for persons of strong constitution than brown bread, in which a greater proportion of the husk is retained. Now, where bread is only consumed in addition, for instance, to meat or cheese, there is already an ample external supply of nitrogen, the bread being in this case a complementary item in the dietary, chiefly valuable for the provision of farinaceous or respiratory material, in which meat—save for its fat—is comparatively deficient. When, however, bread forms, as it too often forms, the main article of food, the loss of gluten involved in the preparation of fine flour becomes a serious matter; and such persons, therefore, as are forced to look to bread for their chief sustenance will derive no immaterial advantage from the purchase and consumption of brown-bread instead of white.

Wheat-flour was formerly subject to considerable adulteration with a number of substances, amongst which have been enumerated potato-starch, Indian corn-flour, rye-flour, rice-flour, alum, chalk, carbonate of magnesia, silica, clay, bone-dust, and plaster of Paris. The cases in which many of these substances have been found in flour have probably been very rare, and most of them may be disregarded, as, at any rate, having altogether fallen out of use for such purposes. The adulterations of bread will be considered subsequently in connection with baking.

While the other cereals obviously occupy in natural economy places subordinate to wheat, there are among them some which present but little less interest.

Oats, both on account of their wide use as fodder for horses and their consumption by ourselves in the form of meal, probably rank next in importance, particularly in Scotland, where oatmeal (as porridge) is regarded, chiefly by the peasantry, as the staple national food, corresponding to the potato of Ireland. Oats (*Avena sativa*) differ materially in their composition from wheat, an important distinction existing between the relative nitrogenous principles of these two grains. Wheat, as has been already mentioned, contains an adhesive nitrogenous substance termed gluten; this, in the oat, is replaced by a peculiar albuminous compound, to which chemists apply the distinctive name 'avenin.' It is owing to the peculiar properties of this substance that oatmeal refuses to form, when mixed with water, a paste such as that produced by wheat-flour. Avenin is somewhat akin in its chemical relations to the so-called 'legumin' of bean-flour; and since it contains a quantity of assimilable nitrogen equal to that of gluten, it is, probably, in no degree less nutritious. Oatmeal, as ordinarily prepared, contains much more flesh-forming material than fine wheat-flour, and often from six to eight times as much oil. Oatmeal frequently contains seven or eight or even ten per cent. of oil, while the whole grain of wheat rarely has more than two per cent, of which the greater part is cast aside in the preparation of flour. Oatmeal is hence much superior to wheat, not only as a muscle-forming food, but also for increasing the formation of fat. In addition to a large quantity of readily assimilable starch, it also contains a notable proportion of sugar, and is capable of furnishing the requisite mineral constituents for the formation of bone. As a food for invalids in the form of gruel—where the digestion is not too weak—it is justly rated at a high value, and its frequent employment as a homely remedy in the case of attacks of cold cause it to be usually regarded as an indispensable item in the domestic economy of well-regulated households. Scotch oatmeal—the adjective denoting the national origin of which is in itself regarded as a sign of excellence, somewhat akin to the prefix 'Devonshire' in the case of cream—is universally preferred, not only on account of the mode in which it is prepared, but also on account of the superior fineness and nutritive properties of the oats grown in the northern part of our island, where the climate appears to be specially favourable to the successful culture of this useful crop.

Oatmeal is occasionally subject to adulteration with barley-meal, a circumstance which it has been sought to explain by the occasional presence of barley grain in parcels of oats. The oats used in the preparation of oatmeal appear, however, to be exceptionally free from any material mixture of the kind, and the presence of barley-meal in oatmeal may therefore, when exceeding very narrow limits, be unhesitatingly ascribed to fraudulent intention on the part of miller or dealer. The relative prices of the two meals render the temptation to sell such an admixture as genuine oatmeal great; and as their therapeutic as well as their commercial value varies very greatly, such practices should be sternly repressed by bringing to bear upon the offenders the penalties of the 'Sale of Food and Drugs Act.' In this case, as in the cases of 'coppered' pickles, 'anattoed' butter and 'faced' tea, there is no doubt that popular prejudice has helped to foster adulteration, by giving to the gratification of the eye that preference which taste and wholesomeness alone should

claim; for it is asserted that retail dealers mix the somewhat buff-coloured oatmeal with barley-meal for the purpose of imparting to the former a whiter and 'cleaner' hue, thus obtaining the rash preference of certain customers, and at the same time pocketing the increased profit.

Before quitting the subject of oatmeal it may be worth while to direct attention to a mode of preparing a palatable description of oatmeal-cake which is much esteemed in some of our country districts. As the recipe is, I believe, 'local,' I give it, as follows: 'Three parts of fine oatmeal and one part of flour are worked into a stiff paste with treacle (golden syrup), with the addition of a very small quantity of lard, and sufficient baking-powder to impart the desired lightness. The paste is then baked in the form of small flat cakes, much resembling, when cooked, the ordinary "ginger-nuts" of the biscuit baker.' After one or two trials anyone may become an adept at making them. These cakes not only combine the nutritious fattening qualities of the oatmeal and treacle, but possess in addition remarkable 'staying' properties, two or three small cakes sufficing to appease the appetite for a considerable time. On this account they are held in estimation by pedestrians or others who may be for some hours out of reach of more elaborate 'dining accommodation,' and who do not care to hamper themselves with the carriage of a more substantial meal. Children, who are naturally fond of sweets, are said to thrive well on a liberal allowance of these cakes, the cheapness of which, in proportion to their nutriment, should recommend them to the labouring classes of rural districts.

Rye is a cereal of more importance in the eyes of the distiller than in those of the baker. It is the grain of the plant *Secale cereale*, and in many of its properties is nearly allied to wheat. It is but little cultivated in England, except for use as a green food for ewes and lambs, its succulent nature while young and fresh rendering it for this purpose a favourite spring crop with many farmers, growing as it will on soils of the poorest description. As a mature crop rye is chiefly grown in Northern countries, where its flour is made into bread by the poorer classes.

Rye-flour is much darker in colour than wheat-flour; and though in its actual chemical composition but little inferior, it makes a bread of very poor quality and clammy consistency. Mixed, however, with three times its weight of wheat-flour, it forms a bread which has been pronounced superior in quality and dietetic value to pure wheaten bread itself. Rye, as already said, is of interest to the distiller as the favourite source of 'Hollands' spirit.

The economical importance of the rye-plant is, strangely enough, materially enhanced by its liability to a certain disease—apparently of a fungoid nature—which occasionally attacks whole fields of this grain, which is then known as 'spurred rye.' This morbid growth, termed 'ergot of rye,' is well known and widely used in the practice of obstetric medicine, and its value is such as to cause the appearance of the ergot on a rye-crop to be hailed with delight by the farmer, who, by the sale of this substance to the herbalist or druggest, may realise far more than the value of a sound healthy crop of grain and straw. Owing to the very powerful physiological action of ergot, it is of the utmost importance that no rye on which it has appeared should be allowed to find its way into the hands of the miller. Many cases of poisoning abroad have been traced to the presence of ergot in rye-bread.

Barley (*Hordeum distichum*) occupies a foremost place in the agriculture of the country, but is, for our present consideration, of minor interest, as its chief use lies in the production of malt for the brewer and distiller. It is an essentially farinaceous grain, containing comparatively little glutinous or albuminous matter, and its starch is readily converted into sugar by the 'malting' process. In the form of 'Scotch barley' and 'pearl barley'—the grain stripped of its husk, and ground into a rounded form—we have favourite articles for culinary purposes, such as the preparation of broths and soups, and also of barley-water for the sick-chamber. Barley-meal is extensively used for cattle, and more especially for pig-feeding; and in Eastern countries the whole grain is used as fodder for horses. The disadvantage of barley as a horse food in our own climate has been explained by its inferior heating properties as compared with those of oats. In the hot climate of the East this objection is obviously removed; hence the satisfactory use of this grain in cases where we find it a failure.

Maize or *Indian Corn* claims our next attention. Its cultivation is chiefly carried on in America, where the large tracts of land covered by this handsome plant (*Zea mais*) present a most imposing appearance. It is also largely grown in the East. The particular one of its preparations which most interests us is that known as 'corn-flour,' which consists of the starch of the grain separated from its cellular fibre, mineral matter, and albuminous constituents. 'Corn-flour' is, therefore, entirely devoid of flesh-forming properties; and though constituting, in addition to other substances, a most nutritious article of diet for invalids, it is in itself incapable of supporting life.

Precisely the same remarks apply to the various arrowroots, which consist entirely of starch—a substance useful as a heat-giving and fattening material, but entirely wanting in bone and flesh forming matter. A few years ago much attention was excited by several cases of infant starvation, in which ignorance of the most rudimentary principles of the science of nutrition had led to the systematic administration of corn-flour or arrowroot without the addition of any nitrogenous food. Some similar cases have again quite recently attracted the notice of the public, with, it is to be hoped, a further inculcation of the simple but important lesson that these starch foods are utterly useless unless properly mixed with milk or otherwise combined with a proper quantity of nitrogen, phosphates, etc.

Medical men, and also food analysts, are frequently asked to pronounce an opinion on the relative intrinsic feeding value of the various arrowroots, corn-flours, etc., the prices of which differ so materially. We have at present no satisfactory evidence to show that one kind of arrowroot is greatly superior to another in this respect, and the probability is that most of the starches differ but little in their digestibility. In chemical composition and general behaviour they are mostly identical; but since the microscopical structure of their granules presents considerable variations, it is possible that their physical differences may 'tell' on their dietetic value. It is, however, all but clear that the enormously high cost of Bermuda arrowroot, for instance, as compared with that of its frequent adulterant, tapioca starch, represents merely a fancy price. So

long, however, as legal enactments ordain that the purchaser is entitled to the exact commodity for which he pays, such adulterations of arrowroot as are largely prevalent must be condemned as fraudulent, irrespectively of any essential difference which they may or may not produce upon the intrinsic quality of the article.

Corn-flour may be prepared in a number of forms, such as puddings, cakes, etc., in such a manner as to form most nutritious and palatable dishes. It is only when full reliance is ignorantly placed upon its unaided virtues that disastrous results occasionally arise.

Rice.—This universally used grain is the seed of the Indian cereal *Oryza sativa.* It consists mainly of starch, of which, in the perfectly dry state, it contains nearly 90 per cent. Though containing but little flesh-forming matter, it is very largely consumed as the principal article of food by the Indian natives, and is a very favourite article of diet amongst the Chinese. Made up into various dishes with milk or milk and eggs, it is a most wholesome food, and as such is esteemed in most English households. It is also largely used in the 'manufacture' of starch for laundry purposes, and in the form of coarse meal it is sold to farmers for stock-feeding. Though not used for bread-making, except as a rare adulteration, it is employed with advantage in the preparation of the so-called 'rice-cakes,' a light and palatable form of confectionery.

Passing to the leguminous plants, we come to *peas,* which are chiefly consumed by us in their unripe state as a green vegetable, being the seeds of various species of *Pisum.* Ripe peas yield, when ground, a flour which is in much demand by cattle-breeders and dairymen, owing to its high feeding value, possessing as it does a large proportion of nitrogenous matter, starch, and oil. Pea-flour has been baked into bread, but is in that form heavy and indigestible; mixed with oatmeal or barley-meal it yields a bread of a better but still of an indigestible quality. Peas, either in the 'split' form or as meal, are much used in the preparation of pea-soup, and also of the homely but nutritious dish, 'pease-pudding.'

Beans, the seeds of several species of the genus *Faba,* resemble peas in their general character and composition. Bean-meal is largely used as a food for fattening stock and for milch cows, and the whole seeds, of various kinds, are mixed with oats for horses. Our chief consumption of beans is in the unripe form, when we eat both the pod and the young seed. Haricot beans, being the ripe seed of certain species, are also a favourite vegetable with many people, who eat them as a substitute for potatoes, than which they are much more nutritious. Bean-flour cannot advantageously be made into any kind of bread for human consumption, on account of its tendency to produce flatulency, owing to the considerable quantity of air mechanically enclosed in the cells of this seed. Bean-flour has, however, been occasionally used as an adulterant of wheaten bread, though there is every reason to suppose that such an admixture is rare.

The subjects of bread-making and baking will be considered in a subsequent article.

THE Royal Society for the Prevention of Cruelty to Animals has offered a premium of 100*l.* for a new railway cattle truck.

THE

SANITARY RECORD.

FRIDAY, DECEMBER 7, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

RELIEVING OFFICERS AS INSPECTORS OF NUISANCES.

THE Royston Rural Sanitary Authority have just decided by a majority of eleven votes to five, 'that the duties of the inspector of nuisances be performed by the relieving officers at an addition to their salary of 25*l.* per annum.' The reasons urged in favour of the change were—1. That it would be a means of giving the relieving officers a greater insight into their work. 2. That, while the work would be done as efficiently as heretofore, there might be a saving to the board. 3. That the addition to the salary of the relieving officers would enable them to have a horse and trap, and thus get round their work more quickly. At the present time the duties of inspector of nuisances are carried out at a cost of 80*l.* per annum, but we are not aware whether the gentleman who holds the appointment acts for any other authority or devotes his whole time to the duties of his office.

We have no hesitation in condemning *in toto* the appointment of relieving officers as inspectors of nuisances. These gentlemen have already more work on their hands than they can properly attend to; and in this Royston Union in particular their board is always bemoaning their shortcomings in relieving officer respect. A relieving officer has almost all his week occupied by fixed appointments for out-door relief purposes. Practically no day is a free day for a relieving officer, and the very essence of the functions of an inspector of nuisances is freedom of movement. How could a relieving officer neglect his pay or relief days to attend to an outbreak of fever or epidemic disease? Even supposing he could look up such cases on his way, what a splendid vehicle he would be for spreading the infection up and down his district! Indeed, almost daily these poor men would render themselves liable to heavy penalties for their disease-spreading acts. This is all supposing they even attempted to perform their work, but with their present engagements even an attempt to do so would be either an imposition or a farce, or both.

We shall be surprised indeed if the Royston relieving officers allow themselves to be appointed

inspectors of nuisances, for on the face of it it will not pay them, but on the contrary. It seems they will be expected to find a horse and trap, and feed and groom the one and keep the other in repair for an addition of 25*l.* per annum to their salaries, besides sacrificing any little leisure left to them by their present onerous employment.

The Royston rural sanitary authority is not known unfavourably for good common sense and hard honest work in poor law matters. It is to be hoped they will reconsider their present unwise determination, and revert to the old arrangement. Even in a surface pecuniary sense the appointment of their relieving officers cannot prove a success. Sickness is a dire enemy to the rates, and a very few cases of infectious disease amongst paupers will cost more than the paltry 15*l.* per annum they now propose to save. If their present relieving officers do not perform their duties properly, by all means let them be made to do so. If they are overworked or underpaid the remedies are obvious, but it is altogether unwise to sacrifice the efficiency of their health department in order to see whether the experiment of transfusion will infuse new life into a decrepit system of outdoor relief.

We notice that the promoters of the change urged that other unions employed their relieving officers as inspectors of nuisances. We regret that the Local Government Board, generally under protest, have been weak enough to sanction a few such appointments, but in the St. Neot's Union, which union the Chairman of the Royston Board evidently regards as a model union, such is not the case, and as the union in question has for many years employed an inspector who devotes his time entirely to inspectorial duties, it is strange how the Royston chairman fell into the error of quoting it as an example.

If relieving officers are to be appointed as inspectors of nuisances, the sooner all sanitary Acts are repealed the better, for they will become practically dead letters.

Notes of the Week.

THE Lyme-Regis improvement commissioners and urban sanitary authority have increased the salary of Mr. John Jerrard, the inspector of nuisances, from 21*l.* to 35*l.* per annum.

AT the Leeds Borough police-court, Patrick Maccabe, a pig-dealer, was fined 20*l.*, including costs, for having exposed for sale, in Leeds pig market, nineteen pigs suffering from foot-and-mouth disease.

THE question of the annual flooding of a large portion of London by the Thames was again referred to at the last weekly meeting of the Metropolitan Board of Works. It was generally agreed that it was the duty of the board to take the remedying of the matter in hand, but there was some diversity of opinion as to what course should be pursued; and in the end, as the subject is still before a committee of the board, it was agreed to defer its further consideration.

THE Bournemouth Improvement Commissioners and Urban Sanitary Authority have decided to apply to the Local Government Board for a provisional order authorising them to borrow a sum not exceeding 40,000*l.* for the construction of a new pier.

THE following have been elected on the first local board and urban sanitary authority for Brandon and Byshottles in the county of Durham, viz., Messrs. John George Crofton, Richard Gardner, William Heppell, John Kellett, John Fisher le Page, Abraham Pearson, Martin William Spoor, and Addison Langhorn Steavenson.

THE following have been elected as the first local board and urban sanitary authority for Brownhills, Staffordshire, viz., Messrs. Matthew Webb, sen., Joseph Thomas Bailey, Joseph Owen, George Brain, John Davenport, Joseph Dolphin, Samuel Henry Hall, Joseph Hadden, and John Cardwell.

AT Leipzig a 'General German Anti-Adulteration Society' has been formed, which has for its main object the prevention of the adulteration of food. A periodical is to appear, or has already appeared, as the organ of this society. At some fifty other German towns branch societies are being established. The special prosecution of the makers and sellers of so-called secret remedies and medicines is included in the programme of this society.

THE STATISTICAL SOCIETY.

THE following is the title of the essay to which the medal will be awarded in November, 1878: 'The Effects of Health and Disease on Military and Naval Operations.' The council have decided to grant the sum of 20*l.* to the writer who may gain the Howard Medal in November, 1878. Candidates will be expected to refer to Howard's experiences in Russia. The rules and conditions of competition may be obtained from the assistant secretary, at the office of the society.

POST-MORTEM EXAMINATIONS.

AT the last meeting of the Middlesex magistrates, an item in the accounts of Dr. Diplock, the coroner, was struck out allowing the fee for a *post-mortem* examination made by Mr. E. L. T. Smith, without a coroner's order, and against the wishes of the relatives of the deceased person, who was eighty-one years of age, and who died in the presence of his wife and of a neighbour. The conduct of Mr. Smith was also censured. Lord Salisbury, who presided, said that if a surgeon, without having any authority, made a *post-mortem* examination, he was committing an act just as illegal as if he had broken into a house, and was just as liable to be turned out by the relatives. He trusted that there would be no recurrence of any such act, but if anything of the kind were again attempted, he hoped the relatives would not scruple to eject the aggressor without the least ceremony.

THE CATCHMENT BASINS OF ENGLISH RIVERS.

THE rivers of England which have catchment basins of above 1,000 square miles are the Thames, which is 201 miles in length, and has tributaries of the united length of 463 miles; the Severn, length 178 miles, and tributaries 450 miles; the Trent, 167 miles, and tributaries, 293 miles; Ouse (Cambridge), 156 miles, and tributaries 212 miles; Wye, 148 miles, and tributaries 223; Nene, 99 miles, and tributary 11 miles; Witham, 89 miles, and tributaries 75 miles; Mersey, 68 miles, and tributaries 188 miles; Ouse (York), 159 miles, and tributaries 629 miles; Humber, 37 miles, and tributaries 55 miles; Tyne, 35 miles, and tributaries 174 miles. The catchment basin of the Medway is only three square miles below 1,000; the length of the river is 69 miles, and of its tributaries 62 miles.

TYPHOID FEVER IN BRISTOL.

MR. DAVIES lately made a report to this sanitary authority to the effect that his statement that Bristol was remarkably free from typhoid had been assailed because several cases had been treated in the general and other hospitals. He pointed out that cases were received into these hospitals from other localities than Bristol, that he did not have notice of the cases admitted into these institutions, and that many admitted were above the class with which the sanitary officers had to deal. He had reported on two unhealthy areas, which had led to unpleasant remarks, and he concluded his statement by remarking that he was always ready to undergo any risk or danger in the service of the authority, and 'would resign his office if they should think fit to reconsider the matter, and arrive at a conclusion different to his own.' The board thereupon carried a resolution expressive of their satisfaction with the manner in which the duties have been performed, and expressed their regret that any attacks in the public papers should have given him pain.

TREES IN PUBLIC THOROUGHFARES.

AT a recent general meeting of the St. Marylebone Vestry, Mr. Tomkins, the surveyor, was authorised to put himself into communication with Messrs. Henderson and Son, of Maida Vale, to take their advice as to the supply of 176 plane trees, to be planted in Hamilton Terrace, St. John's Wood, 88 on either side, 40 feet apart, about 2 feet inside the kerb. The vestry ordered the work to be carried out as soon as possible, and requested that the 240*l.* collected by the inhabitants might be paid to Mr. Greenwell, the clerk, to be applied in making the improvement. Mr. Edwards said that in two or three years' time the vestry would have one of the finest avenues in the metropolis. An application was read from Mrs. Whitton, of Wells Road, Regent's Park, North, asking permission to plant lime trees in Wells road, seven yards apart, between the centre flags on the footway and the kerb. She had ascertained that the proposition would not be objected to by the residents of the road, and she was willing to bear the whole of the expense. Mr. Carr said the road would look very nice when planted, and he would move that the offer be accepted, provided the work was carried out to the satisfaction of the surveyor. The motion was carried.

SALT IN BEER.

THE following extract from the last report of Professor Bernays, public analyst for the parish of Camberwell, is of interest when read in connection with the controversy raised by Mr. Plimsoll's speech: 'In the past quarter I have examined eleven specimens of beers, ales, and porters. As to alcohol, except in a spruce beer which contained 14·3 per cent., the variation was only between 8 and 10·5 per cent. The same lack of hops is exhibited as of old; at least a little goes a long way. But the most curious feature is in the increase of salt. It will perhaps be remembered how often I have mentioned the almost absence of salt in days gone by. Now, however, we have arrived at a quantity, in the case of No. 70, so large that I ventured to obtain a magisterial decision and a penalty, reduced at the request of Mr. Marsden from 10*l.* to 5*l.*, together with costs. May I give examples, stating the grains per gallon? No. 57, not estimable; 58, 5·60; 59, 11·20; 68, 13·30; 67, 30·10; —, 32·90; 63, 34·30; 61, 44·10; 60, 47·69; 69, 58·10; 70, 82·60. Here, then, we have, from a merely nominal presence, as much as 82 three-fifths grains in a gallon—a quantity sufficient to induce thirst and to encourage drunkenness.

THE METROPOLITAN GAS SUPPLY.

DR. WILLIAMSON, F.R.S., the chief gas examiner to the Board of Trade, has reported to the Corporation of London the results of the daily testings of the gas supplied to the City during the past quarter. He states that the average illuminating power in standard sperm candles was 16·7 at the Beckton testing place, and 16·5 at that at Friendly Place, this result being above the requirements of the Act of Parliament. Only on two occasions had the illuminating power sunk so low as the minimum of those requirements. As regards purity, sulphuretted hydrogen had been uniformly absent during the quarter. The average proportions of sulphur present in other forms had been 10·5 grains per 100 cubic feet of gas at Beckton, and 9·8 at Friendly Place. At both stations those averages were below the quantity allowed by the Act. At Friendly Place the quantity had never been above the parliamentary maximum, and at Beckton that maximum had only been exceeded on one occasion, while at both testing places the amount present had nearly always been well within the limit fixed by the Act. Ammonia had almost always been present in the gas tested at Beckton, though only in small quantity. At Friendly Place, on the other hand, it had very often been absent, and, like Beckton, always to an inconsiderable amount.

THE PURCHASE OF THE LONDON WATER COMPANIES.

THE following memorandum with reference to the proposed acquisition of the London Water Companies by the Metropolitan Board of Works is of interest: 'The water works are in the hands of the corporations at Liverpool, Manchester, Leeds, Bolton, Preston, Blackburn, Oldham, Bradford, Glasgow, Dublin, and many other important cities and towns. The corporation of Birmingham also successfully promoted a bill in Parliament in 1875, and the Middlesborough and Stockton authorities in 1876, for the compulsory acquisition of the local water companies' undertakings, so that the principle of the advantage of the supply of one of the first necessaries of life not being allowed to remain a mere commercial speculation is fully recognised by the Legislature. The requisite Parliamentary notices for next Session have also been given in the cases of Nottingham, Leicester, Scarborough, Exeter, and Cheltenham. It is estimated by competent authorities that when the question of the advantage of purchasing the London Water Companies was originally mooted before Sir James Graham's Committee in the House of Commons in 1851, the purchase-money would not have exceeded 6,000,000*l.*; in 1865 the valuation had increased to 12,000,000*l.*; and the present estimate is roundly stated at 25,000,000*l.* The capital outlay of the London Water Companies is increasing at an enormous rate, and seeing that money secured upon the water rates could be raised by a public authority at 3½ per cent., whereas shareholders in companies reasonably enough look for considerably more—it is evident that for every year the purchase is delayed the terms on which the companies could be purchased will become proportionately more disadvantageous to the public. The saving in capital outlay by the construction of united instead of isolated works, and the consolidation of management under one in place of eight separate heads, cannot fail also to be productive of great economy and advantages.'

THE EUCALYPTUS GLOBULUS.

THE culture of the eucalyptus in Algeria is strongly recommended in a report by Consul Playfair, lately issued. Owing to the destruction of forests in that country, the climate is changing in an appreciable degree every year, and the question, not only of restoring the wood that has been lost, but of providing a supply of a constantly decreasing article, is a most important one to the statesman and colonist. If this had to be effected by planting such trees as oak, ash, pine, etc., all of which are indigenous to the country, it may well be imagined that a speculator would hesitate about engaging his capital in an enterprise which could hardly yield him a return in his lifetime; but with Australian trees, which grow as freely in Algeria as in their native country, he may expect to cover his expenses in ten or twelve years, and after twenty or twenty-five to obtain as great results as could be realised by oak

forests of a century's growth. It is hardly more than fifteen years since the first eucalyptus trees were introduced into Algeria, yet their growth, as shown by Consul Playfair, has been extraordinarily rapid, and some remarkable examples are given in the report of the action of the eucalyptus in improving the sanitary condition of unhealthy districts and in dissipating miasmatic influences which created such havoc among the colonists in the first years after the conquest. For instance, formerly it was impossible for the workmen at the great iron mines of Mokta-el-Hadid to remain there during summer; those who attempted to do so died, and the company was obliged to take the labourers to the mines from a distance by train every morning, and to carry them back every night. From 1868 to 1870 the company planted more than 100,000 eucalyptus, and now the workmen are able to live all the year through on the scene of their labour. The entire works and the railway leading to them are bordered with thick belts of these trees, and each of the miners has his cottage and kitchen garden surrounded with them. Consul Playfair is convinced that no culture in Algeria offers such prospects of success as eucalyptus if the cultivator can afford to remain for a considerable time without any return for his capital.

Special Reports.

THE TELEPHONE.

ON the 28th ult. a lecture was delivered by Mr. Graham Bell, at the Society of Arts, on 'The Telephone.' Having traced the history of the instrument and the progress of electric telephony, the lecturer explained by diagrams the action of what are called the 'intermittent,' the 'pulsatory,' and the 'continuous' currents of electricity. He claimed the credit of being the first to apply the latter current, all previous descriptions of telephones having been on the 'intermittent' or 'pulsatory' plan. Not alone by his method could the tone and pitch of the voice be transmitted, but the very 'timbre' of the voice itself; the sound travelled not with mechanical, but electric speed, he himself, sitting in a room in Boston, having conversed with a gentleman, 280 miles distant, with the same ease as if they were occupying the same apartment. There were arranged on a table in the lecture-room two telephones, one in connection with a house on the opposite side of the street, and the other with a house in Gough Square, Fleet Street. Several experiments were tried by the lecturer and some of the audience, the result in each case being satisfactory, the reply coming from the other end almost instantly, and with the utmost clearness.

GLASGOW SCIENCE LECTURES.

DR. B. W. RICHARDSON delivered the second lecture of this course on Nov. 29. The subject was 'The Health of Great Cities.' After some prefatory remarks, Dr. Richardson said that until recent times Glasgow had not flourished greatly in regard to health. At last she was making progress in that direction, and he could clearly say, after the lapse of thirty years or so, when he lived in this city, great improvements had been made between this time and that. But still it would not be fair to say that Glasgow was a model city of health. Sometimes in England they had been actually appalled to look at the death-rate of Glasgow, and were obliged to compare it with Bombay, Calcutta, and other cities much less favoured than she was in regard to sanitary requirements. But she was not now worse than other cities, and in many respects she was better; and every day she was clearly improving, as the death-rate showed. He wished on that occasion to speak on matters of sanitary progress, not simply as referring to Glasgow, and not as referring to any particular city, but rather in dealing with two points. He wished to take from science a kind of stigma that was attached to the sanitary work of science, the stigma that sanitary work had not made that practical progress that it might have done. It was constantly thrown in the teeth of scientific scholars that notwithstanding all their labours the death-rate had not materially changed. He wished to show that in various directions science had worked wonders for the health of great cities, and he desired also to show that it was the fault of cities, not of science, if good results did not follow. In the first place, they had ascertained from science as a definite fact that the diseases which killed mankind might be divided fairly into two classes—preventable and not preventable; and what was more, they had learned that the preventable diseases numbered at least one-half of the whole of those which at present proved mortal. So that out of 420,000 cases of death which occurred in a year in England and Wales, 210,000 at the very least might be accepted as arising from diseases that were due to preventable causes, these facts having been learned by careful analysis; and the same analysis showed that perhaps it might be possible to say soon that some diseases which were presently recognised as unpreventable were preventable. In the second place, science had shown that death is the shadow of birth. No more remarkable facts have come out than that in great and small communities alike, if the births occurred in excess, then the deaths necessarily followed in excess. And it was a great thing for people to know if they fairly took any one community, if the birth-rate did not exceed a certain measure—if there should be such a correct, moral state that the birth-rate would not exceed a certain measure—then the death-rate would be reduced as a natural consequence, whatever the other sanitary conditions might be. They also learned from science that wealth and luxury were often apart together from sanitary progress; and, in fact, sanitarians dreaded now to hear of places beginning to get wealthy. People who lived in luxurious style, and who were not engaged in pursuits which lead to great activity of mind and body, were found to be deficient in vitality. Some curious facts had come to light in regard to this matter of late. Careful inquiries and attention in different parts of the world had demonstrated that less mortality proportionately existed amongst the Jews than any other people; and this was solely traceable to the simple frugality of the life they lead. Luxury was opposed to the progress of sanitary work, and certainly reduced vitality; frugality, independent of other sanitary circumstances, was a certain passport to prolonged vitality. Then it had been found that occupations had a marked influence on mortality, not as occupations, but from some surroundings which interfered with the life of the workers. Thus it had been discovered that of seventy occupations in England, the highest mortality was amongst barristers, and the lowest amongst cabmen. Grocers died at the rate of 76 to the 100, and drapers at the rate of 108 to the 100; blacksmiths, at the rate of 97; publicans, 138 to the 100; agricultural labourers, 91; dock labourers, 121; wheelwrights, 88; engine-drivers, 121; carpenters, 91; and tobacco manufacturers, 105 to the 100. In analysing the cause of the difference between drapers and grocers it was found that it lay in the mode of living. The disease which destroyed the draper was pulmonary consumption. The explanation was simple. The grocer lived in a shop, the door of which was open the whole day, and he was very active himself in business; the draper on the other hand, lived in a close place with the doors of his shop closed, in a dusty, close atmosphere. Science had also shown that clean dwellings—well ventilated and lighted, and warm—were conditions which lead to the lowest possible death-rate. Lastly, science had thrown light on food and drinks. It had proved in regard to alcohol that it was not essential to us in any way, that it supplied no healthy food, satisfied no want; but that if indulged in even to the smallest degree, it degraded and shortened life to the extent

which he had told of in his table of occupations. Dr. Richardson then proceeded to classify a few of the applications which science inculcated. These were the foundation in all large cities of schools of health—where special instruction in the main principles of health could be taught; and that should not be a difficult matter, he thought, in a city like Glasgow where we had so able an officer of health as Dr. Russell; the establishment of sanitary museums in every town—where all improvements in regard to sanitary matters could be exhibited; the opening of schools for the practical training of cookery—one of the most important branches of education; the lessening of the hours of physical work—the securing for all towns of proper water-supply, which was already enjoyed by Glasgow—and he would compel all municipal bodies in the country to do the same for their places; then the purification of the atmosphere, which would be achieved by the removal of smoke from the towns; next, the prevention of contagion, to be secured by the registration of disease, complete isolation of affected persons, the erection of houses for their reception at convenient localities, the opening of public laundries, the providing of public work-rooms, which could be let out at a small rate to workmen, and the establishment of public mortuaries to which infectious bodies could be removed. Last of all, they must do what they could to close the dram-shop. Their science would be of little avail until that could be done—at least, to a very large extent. There were various ways of achieving that end—one was to afford counter-attractions; another was to suppress on all favourable opportunity; a third was by the force of personal example, which was the wisest that could be pursued.

RABIES AND HYDROPHOBIA.

DR. ACLAND, the Regius Professor of Medicine at Oxford, delivered a lecture on November 30, on 'Rabies and Hydrophobia' before the University in the theatre of the Museum. Dr. Acland commented on the strange character of animal poisons, first remarking that man knowingly created for himself many poisons in earth, air, and water. The most deadly were those naturally produced by venomous snakes. Quoting from Sir Joseph Fayrer's great work on Thanatophidia, and speaking in high terms of Sir Joseph's contributions to science, he described the rapid death produced by the normally secreted poison of reptiles through the destruction of the nervous system. An analogy was drawn between this kind of animal poison and that secreted by rabid dogs. The ravages made by a single dog were described by quotations from Youatt and Fleming, the latter of whom the lecturer characterised as 'the indefatigable exponent of comparative pathology,' eulogising his writings. The essential nature of the mode of action of the poison on the nerve tissue was explained, the poison acting either on the periphery of nerves—on their trunks—or on the nerve centres, on two or on all of them. Doubt was expressed as to the effect of the curare poison on really developed cases of hydrophobia, though it was admitted it might, perhaps, turn out a true remedy in snake-bite, and possibly, though not probably, in hydrophobia. Dr. Acland said he had had measures taken by Mr. Yule to test the strength and effects of a given dose of curare, in preparation for using it on a suspected case of hydrophobia from dog bite, which had lately come under his care, but the symptoms subsided. He mentioned it to show that in a matter of life and death such experiments might be urgently called for. As to the prevention of hydrophobia, he endorsed the proposal to have a most rigorous dog tax, that every dog should have a collar with the name of the owner and the number of his licence, and that any dog abroad without such collar should be destroyed. Mr. Fleming's proposals to circulate precise instructions with all dog licences were warmly recommended. An urgent appeal was made to the University to use every effort to found a chair of general and comparative pathology. At the conclusion of the address, important and beautiful microscopic preparations were shown, for which the lecturer expressed his obligations to Dr. Gowers, of University College, London, and to Dr. Greenfield, of St. Thomas's Hospital. By these it was shown that already scientific investigation is demonstrating, by aid of the most skilled microscopic appliances, the actual mechanical changes produced by hydrophobia in the nerve tissues of the respiratory centres, in the medulla oblongata, and elsewhere in the nerve centres.

THE LONDON SCHOOLS SWIMMING CLUB.

AT the annual meeting of this club held lately, it was stated that during the season 1,577 boys and girls of public elementary schools in London had been under instruction in various baths and in Victoria Park lake. This was an increase of 129 over the number taught last year, although the season now ended had begun later, and some of the baths were closed for repairs and enlargement. The number of schoolmistresses and girl pupil-teachers learning to swim had also increased, notwithstanding the great difficulty of providing for their instruction. The medals, prizes, and certificates obtained in competition by more than 100 children, who had all been unable to swim at the beginning of the season, were distributed by Mr. J. MacGregor, and the meeting was addressed by several members of the present and of the last School Board. Several of the speakers urged that some contributions from the rates should be made for instruction in swimming, as is done in Birmingham.

SOCIETY OF ENGINEERS.

AT a meeting of the Society of Engineers, held on the 3rd instant, a paper was read by Mr. Robert Sutcliff on 'Tube Wells for large supplies and in various strata.' This paper was supplementary to one read at the previous meeting of the Society on 'Tube Wells,' by Mr. Le Grand, which dwelt with the subject of tube wells (commonly known as Abyssinian) see SANITARY RECORD, August 10, 1877, of small size. Mr. Sutcliff observed that in laying down plant for obtaining large supplies of water a number of tube wells were coupled together by horizontal mains, so that one pumping engine drew from many tubes. In this way, for the last eight or nine years, the leading breweries in Burton-on-Trent have obtained the bulk of their water supplies. Messrs. Allsopp and Sons pump 600,000 gallons daily from thirty 3-inch wells, and Messrs. Bass and Co. 500,000 gallons from twenty-five tubes. Thus in one town two breweries are obtaining sufficient water for a town of 40,000 inhabitants. Although some of these Burton wells are within a stone's throw from the Trent, the quality, level, and temperature of the water differ from those of the river water. The town of Carmarthen, in Wales, is supplied by ten 2-inch tube-wells. In sandy soil, strainers or filters are used, which prevent sand coming into the tubes. A tube-well was sunk in a very fine sand at Chislehurst by pumping up six barrow loads of sand and replacing it with gravel. One advantage of the gravel filter is its imperishability, and if made sufficiently large, the velocity of the water is not sufficient to bring the grains of sand within the area acted upon by the pump. The author observed that in rocks and other hard strata the method of sinking tube-wells was similar to that employed in making artesian borings, but the mode of pumping and development of supply was entirely peculiar to the tube-well system. Bored tube-wells can be made through any stratum and to any depth that an ordinary artesian boring can reach. Mr. Sutcliff thought it possible that coupled tube-wells in the chalk might solve the problem of providing London with pure water.

KING'S COLLEGE ENGINEERING SOCIETY.

AT an ordinary meeting of this society, held on Oct. 26, Professor J. Tennant, F.G.S., in the chair, a discussion was held on the several appliances for the pavements of roads. The discussion was opened by Mr. Guinness,

who gave a general description of the macadamised road and the steam roller. Mr. Alliman gave some useful information in reference to the asphalte and wood pavements, and described the construction of roads in Russia. Mr. Samuel described the ancient Roman roads, and suggested that a macadamised road, consisting of broken granite and pitch, used in the same manner as the granite, could be made very useful in places where the traffic was not too great. Professor Tennant, in summing up, said that the subject was of great importance, especially where so vast a population as that of London was concerned. He first referred to the alterations in transit which had resulted from the introduction of the locomotive, and as an illustration of the progress made, he stated that when he first came to London it took him thirty hours and cost him 30*s*, to travel the distance, which now occupied only four hours, at a cost of 10*s*. The Strand at that time was paved with boulder stone, similar to the present pavement of Scotland Yard. Wood pavement was introduced about thirty years ago, but was soon discontinued on account of the exhalations which arose from it when saturated, and which tended to produce fever. The Professor then proceeded to examine the advantages and disadvantages of wood pavement. He said that four years was the longest time that it has been found to last in London, and that it was twice or three times as expensive as granite. The expense of the present granite pavement of the Strand was 17*s*. 6*d*. per square yard, but formerly when large stones were used it only cost 15*s*. per square yard. It was found that horses could not get a thorough foothold on the larger stones, and resort was consequently had to the present material. Amongst the disadvantages which had presented themselves since the introduction of wood pavement was the increase in the number of accidents, which had occurred chiefly on the noiseless approach of Hansom cabs and other vehicles. At the conclusion of the discussion a hearty vote of thanks to Professor Tennant for his valuable and useful address was unanimously carried.

Medical Officers' Reports.

NEW YORK, U.S.A.—The Quarterly Reports issued by the Statistical Bureau, New York, U.S.A., differ materially from those issued by our Registrar-General; each consists only of four pages of statistics, without any discussion, so that an immense mass of information is given in a small space. They not only contain the statistics for the quarter as regards New York, but the death-rates for most of the large cities of America, as well as of the capitals and some other large cities of Europe, Canada, India, and Australia. During the quarter ending March 31, 1877, there were 6,002 deaths registered in New York, which is the smallest number since 1871, the annual death-rate being 22·28 per 1,000 population, and of children under one year 22·1 per cent. of the total deaths. In the quarter ending June 30, the total deaths were equal to an annual rate of 22·45. The number of births registered is said to be incomplete, which partly accounts for the small number, viz., 6,230; but if the number belonging to this quarter be carried on to the next, which shows only 5,515, there must be a large number unaccounted for. The statistics embrace several points of interest not included in our returns, such as the number of still births, their sex, period of development, etc., the floor on which the death occurred, the place of nativity of the father and mother. As the registration of births is said to be imperfect, it is useless to calculate the deaths of children under one year to total births, etc. The zymotic death-rate in the first quarter was 4·47, and in the second 5·79 per 1,000. The most fatal diseases in the first quarter were—scarlatina, 1·09; phthisis, 3·91; bronchitis, 1·37; pneumonia, 2·79; of the nervous system, 1·10; and from kidney disease, 1·0 per 1,000 population. In the second quarter diarrhœal diseases are debited with 1·72, bronchitis and pneumonia with 2·88 deaths per 1,000 population, the others remaining nearly the same as in the first quarter. The effects of a cold wet spring on health in New York is not so marked as in London, for in 1874, when the mean temperature of April, May, and June, in New York was about 3° Fahr. below the average, and the rainfall was very large, namely, 13·79 inches, the mortality was greater than in 1877 when the rainfall was only one-half and the temperature higher.

During the first and second quarters of 1877 the annual death-rates for New York were 22·22 and 22·51; of Philadelphia 18·05 and 19·69; of Brooklyn 20·21 and 19·74; of Washington 26·05 and 24·20; whilst of St. Louis, with a population of nearly 500,000 persons, the annual death-rate is returned at 11·62 and 10·44; Springfield at 10·53 and 12·26; Toledo, Ohio, at 10·53 and 9·16; and Lansing, Mich., at 9·48 and 5·17 per 1,000 inhabitants, there having been only twelve deaths reported in the second quarter amongst a population estimated at more than 9,000 persons. This is so small a number as to lead to the belief that some of the deaths were not registered. The death-rates for these quarters in some other cities were excessively large. Thus in London they were only 23·6 and 22·2; in Paris 28·3 and 26·1, in Berlin 24·9 and 32·5, in Vienna 27·3 and 31·8, in Naples 40·1 and 31·8, in Bombay 44·9 and 65·0, and in Madras 112·8 and 121·6 per 1,000 inhabitants. The great variations in these death-rates show that even after allowing for differences of climate there must be a large number of preventable deaths in many even of the American cities, and far more in such cities as Naples, Bombay, and Madras, irrespective of famine deaths in the two latter places.

CLEATOR MOOR.—The population is estimated at 7,932, the births were 327, and the deaths 110, giving a death-rate of only 13·86, and a birth-rate of 41·22, whilst the zymotic death-rate was 3·27 per 1,000. Dr. Eaton remarks that great attention had been paid during the year to improvements in the drainage, including the conversion of privies into water-closets. Dr. Eaton however, remarks that there are 67 houses without any privy accommodation, and that they should be provided with water-closets. Three cases of typhoid fever occurred during the year, two of which were found to have been caused by sewer-gas escaping into the houses. He also insists on the necessity for a fever hospital being erected in the district.

REIGATE.—Dr. Jacob begins his report by referring to two cases of small-pox (a man and his wife), which he thought originated from the man assisting in moving some rags which came from London. He also details the particulars of an outbreak of typhoid which originated at the rectory, and spread to eleven persons, without his being able to account for the spreading of the disease, 'as no connection of any sort could be established between the rector's illness (who contracted the disease outside the parish) and the subsequent cases in the village.' The birth-rate in 1876 was 32·5, and the death-rate 15·5 per 1,000 population, which was 1·3 above the mean of ten years. The death-rate from seven chief zymotic diseases was only 1·5 per 1,000, and amongst infants under one year it was 10½ per cent. of the total births registered. As the water-supply was indifferent, some tube wells were tried, but the water obtained was not fit for use. As the drainage of Horley was imperfect, an extension of the outlet sewer was constructed, but there are several villages which require better arrangements for preventing injury to health from foul ditches. The table of sanitary work indicates considerable activity in the inspection of premises and removal of nuisances.

GLASGOW.—The medical officer of health has issued a continuation of his elaborate statistics for the quarter ending June 30, which shows that the annual death-rate per 1,000 inhabitants at all ages, was 27·02 for the whole city, but varied between 19·85 in the first group of districts (the best class) and 34·97 in the fourth group, which con-

tains about 71,812 inhabitants of the poorer classes. In this group 44¼ per cent. of the separate lettings consist of one apartment only, and only 4½ per cent. of more than three apartments. The percentage of deaths to 100 births oscillated between 12·23 in the first group, and 15·66 in the fourth, and of certified deaths under one year between 83·72 per cent. in the first group, 77·14 in the second, 60·50 per cent. in the third, and only 48·71 per cent. in the fourth, so that in the poorest districts not half of the children who died under one year old had received medical attendance. This is a sad state of things, and should be checked as far as possible, by holding inquests in cases of uncertified deaths. The birth-rate varied between 31·08 per 1,000 population in the first group, and 44·74 in the second group of districts.

Law Reports.

PULLING DOWN ADJACENT HOUSES.

V.-C. HALL has had before him the case of *Howe* v. *Croxton*, an application for an injunction to restrain the authorities of the Metropolitan Free Hospital from demolishing premises adjoining the plaintiff's in such a way as to injure the Sir Paul Pindar public-house, occupied by him in Bishopsgate, the locus being required for the defendant's new hospital. The premises date from the reign of James I., when they formed one edifice, and the present houses so overlap and intertwine that the rooms of one are in some cases situated under those of another. The gilt and carved ceilings of the old building, it may be mentioned, were considered so curious, that they were removed to the South Kensington Museum. An interim order had already been granted to prevent injury to the plaintiff's premises. His lordship granted a perpetual injunction without prejudice to the defendant's proceeding, as far as they could, without causing injury to the plaintiff's premises.

BEER ADULTERATION: HEAVY PENALTY.

R. KIRBY, landlord of the Albert beer-house, Clapham, was summoned for having a certain article upon his premises as a substitute for malt, and mixing sugar with beer. It appeared from the evidence of officers of Inland Revenue, named Pargeter and Cook, that on September 24 last they visited the defendant's house to examine the cellar. On the stairs Pargeter found two stone jars of treacle. Half way down he found three bags containing loaf sugar. He examined a cask of ale which had recently been refined, and found traces of sugar, salt, and water. He told the landlord that he had been mixing his ale. He said that he had not. He told him that he had mixed sugar, water, and salt with it. He replied that it was of no use to deceive him; that he had put 1 lb. of sugar, a gallon of water, and a handful of salt in the barrel. The officer examined a barrel of porter, and found that it had been mixed. The defendant said he used the treacle in the porter and the sugar for the ale. The sugar and treacle were seized. Mr. Paget dealt with the first count, the second being withdrawn. He said he should reduce the penalty of 200*l.* to one-fourth. If deleterious articles had been found he should have imposed the full penalty.

MILK ADULTERATION.

JOHN DRAYTON, milkman, Frankwell, Shrewsbury, was summoned for selling to Inspector Farr a quantity of milk which was not of the nature, substance, and quality demanded by him. Dr. Thursfield, medical officer of health, said that samples of the milk had been submitted to Mr. Wanklyn, the most eminent authority on the subject in England, and perhaps in Europe, and he had pronounced the milk to be adulterated with 15 per cent. of water. The defendant could not say that he had not had warning. Sergeant Farr deposed that he was the inspector of weights and measures for this borough. On October 13 he took samples of the milk, which the defendant's son was selling. He took three samples, one of which he now produced. One sample he sent to the analyst, and one he gave to the defendant. Dr. Thursfield put in the certificate of Mr. Wanklyn, showing that in the sample analysed there was 15 per cent. of water. Three samples were sent up. One was found to be unadulterated; the other was stated to be rather poor; and the third to be adulterated to the extent of 15 per cent. of water. Mr. Chandler said the defendant was excessively sorry. The milk was carried about by the son. Whether the son, in a moment of indiscretion, did anything wrong he could not say. This was the defendant's first appearance, and he expressed regret, and promised it should not occur again. He hoped the Bench would deal leniently with the case. In reply to the Bench Dr. Thursfield said that 15 per cent. of water had been absolutely added to the milk. It was an offence to add any water. Mr. Sandford said the defendant was liable to a fine of 20*l.* and costs. The costs were rather heavy. The defendant would be fined 2*l.* and costs. The defendant had to pay 4*l.* 0*s.* 9*d.*

THE VACCINATION ACTS.

THE case of *Tibbs* v. *Jones* has been heard before the Lord Chief Justice and Mr. Justice Mellor. The case raised the important question as to the execution of the Vaccination Acts. Under section 31 of the Act of 1871 (30 and 31 Vict., c. 84) if any officer appointed by the guardians to execute the Act shall give information to a justice that he has reason to believe that any child under fourteen has not been successfully vaccinated, and that he has given notice to the parent to have the child vaccinated, and that the notice has been disregarded, the justice may summon the party, and if he shall find that the child has not been vaccinated and has not already had the small-pox, he may make an order to have the child vaccinated within a certain time, and in case of disobedience the party may be proceeded against. The question was whether, if the order is still disregarded after conviction, the party may again and again be proceeded against. The question had already been before this Court, not long after the Act of 1871, and on April 25, 1872, on an application to quash a second conviction, the Lord Chief Justice said 'that the continued disobedience to the order may constitute fresh offences and be subject to fresh proceedings,' and Mr. Justice Blackburn said that 'it might as well be contended that because a man has been fined yesterday for beating his wife he could not be fined for beating her to-day.' Notwithstanding, however, these expressions of judicial opinion, many persons in different parts of the kingdom have entertained such strong objections to the vaccination of their children, that, even after having been convicted for refusal, they have continued to refuse, and the officers have been driven to fresh proceedings. The present case, which arose in St. Pancras, was one of these cases. The appellant had been convicted, and, as he still refused, the officer gave a fresh notice, and upon that laid a fresh information. The magistrate, on the evidence before him of non-vaccination, convicted the defendant, but granted a case. It was objected that there was an order in force under which fresh proceedings were not to be instituted without application to the guardians and their special directions; but the case did not raise this point, and only raised the question whether fresh proceedings could be instituted at all. On the part of the appellant it was urged that the enactment, being a penal enactment, was exhausted by one conviction under it of the same party in respect of the same child; but the Lord Chief Justice observed as to this that it would enable every obstinate man who thought himself wiser than the rest of the world to set the law at defiance. It was urged that there were men who so strongly objected to vaccination that rather than have their children subjected to it, they would go to gaol.—The Lord Chief Justice: Then let them go to gaol; the law must be obeyed.—Mr. Justice Mellor: Until the child is successfully vaccinated

the enactment is applicable and is to be enforced.—It was urged that according to this the parent might be sent to gaol again and again until the child was 14, so as to be continually in gaol for twelve or fourteen years.—Mr. Justice Mellor said the object of the Act was to protect the public health, and that object was paramount to the inconvenience of the individual.—It was urged that there was a provision that proceedings should not be taken after the lapse of twelve months; but the Court pointed out that this applied to each offence, and did not affect the present question.—The Lord Chief Justice observed that the construction contended for would render the Act entirely abortive and ridiculous. To hold that because a man persisted in not having his child vaccinated he may endanger the public health as well as the life of his child, and may continue doing so with entire immunity from the law, would be to make the legislation on the subject as worthless as waste paper.—It was urged that by the order fresh proceedings were not to be instituted without the special directions of the guardians, and it was stated that in this case it was not proved that there were such directions; but the Court said the case did not state this, and they could not, therefore, entertain the objection.—It was urged, that there was no evidence that the child was in the district; but this, again, was a point not in the case as stated. It was again urged, on the general question, that the Legislature could never have intended that a man, on account of his conscientious objection to vaccination, should be kept for years in prison; but the Court said the Legislature could not have intended that their legislation should be rendered abortive. It was not merely an opposition to vaccination, but to the law which prescribed it, and which all were bound to obey.—It was urged that men would retain their opinions and could not be deterred from doing so merely by being called idiots. The Lord Chief Justice observed that this was true, no doubt, for the more idiotic men were the more obstinate they were. After some further discussion, the counsel for the appellant, said that, perceiving the court were so strongly against him, he would not further press his argument, and sat down; and the court, without calling on the counsel for the officer gave judgment in his favour. The Lord Chief Justice said there really was nothing in the objection raised in this case to the conviction—that because a man had been once convicted for non-compliance, therefore he could not be convicted again, or only once in twelve months. Such a construction would make the Act perfectly abortive, and a man would be allowed, at his pleasure, to endanger the life of his child and the health of his neighbours. The penalty was not heavy, and it was evidently intended that it should be inflicted as often as the offence was committed and an order for vaccination disregarded. Mr. Justice Mellor concurred. The great object of the Act, he said, is the public health, which required that it should be enforced. The object was to compel and obtain successful vaccination of children under the age of fourteen. As there were always some persons who thought they knew better than the legislature, the legislature had provided that penalties should be inflicted, and it was evidently intended that the penalties should be inflicted as often as the offence was committed. It was not enough for the man to set up 'conscientious objection.' No one was more disposed than he was to allow for conscientious objections; but they could not be yielded to when contrary to the law and opposed to the welfare of society and the common experience of mankind. Appeal dismissed, with costs.

Reviews.

Report on Fever Carriages of the Metropolis. By DR. JAMES STEVENSON, M.D., Medical Officer of Health for Paddington.

DR. JAMES STEVENSON, in a 'Report on the Fever Carriages of the Metropolis and on the Removal of Persons suffering from Infectious Diseases,' gives us the results of a pilgrimage recently undertaken by him, with a view of ascertaining the sort of vehicles employed and the amount of care exercised in the removal of the infectious sick, and for the protection of the general public. The experience he has acquired, it must be confessed, is not altogether reassuring. The ambulances, generally the property of poor law guardians, are, in exceptional cases, provided by the vestry or district board of works, while, in two instances at least, they are the property of contractors. Usually left in the charge and on the premises of the workhouse authorities, examples are not wanting of their exposure in parish stoneyards and in open mews within reach of passers-by, and in contact with other vehicles. In some parishes the same carriage is employed indiscriminately for the removal of fever and small-pox cases. Built, as a rule, for the purpose to which they are applied, there are among 'fever carriages,' ordinary cabs, or broughams, with their original lining of cloth or leather. In some of the ambulances, the patient can lie down, on a movable tray or bed, more or less well fitted and comfortable, or at least on the floor; while in others the recumbent posture is impracticable. There is little uniformity in the arrangements for attendance on the the sick *in transitu*. Some parishes provide a nurse, others depend on pauper help, and a few leave the sick to the care of their friends with such help as the drivers can give—these men generally living under the control of the guardians. The disinfection of the carriages does not appear to be very regularly performed, nor the steps to secure the efficiency of the process all that could be desired, while the general oversight of the vehicles and bedding, etc., seems to be of a somewhat perfunctory character. The ambulance is usually placed at the disposal of parishioners, not being paupers, without charge, but the borrower is generally expected to pay for man and horse hire. Dr. Stevenson concludes that the existing arrangements are 'improvident, insanitary, and inconvenient,' advises a 'policy of concentration both as a matter of economy and with the view to avoid loss of time in the removal of the sick; and recommends that the managers of the infectious disease hospitals should provide ambulances of the most approved construction, with horses and drivers, and that a trained and paid nurse should superintend the removal of the sick and accompany them to the hospital. We have no doubt but that the attention thus usefully directed to this important question will have good effects.

A Systematic Handbook of Volumetric Analysis. By FRANCIS SUTTON, F.C.S. Third Edition. London: J. and A. Churchill, New Burlington Street. 1876.

THIS book might be not unfairly described as an English version of Mohr's celebrated 'Titrirmethode,' with which, however, the translator or adapter has taken very great liberties. There are likewise concluding chapters on Water-analysis and on Gas-analysis, which, if the author had called his book an English version of the 'Titrirmethode,' should have been styled an appendix. The book offers an illustration of the confusion arising from the introduction of the new notation into chemical analysis.

We quote p. 11: 'The atomic weights used are based on the latest researches. The formulæ are constructed on the basis H = 1, O = 16, H_2O = 18.' 'Normal solutions are those which contain one gramme atom of reagent (taken as monobasic), or an equivalent in some active constituent (*e.g.* oxygen) in the litre.'

'One gramme atom (taken as monobasic)' is a delightful confusion, and the plain English of page 11 is that though the author writes the so-called modern formulæ, he arranges the strength of his standard solutions just as Mohr does, viz., in accordance with the old notation; and that being so the book would gain in clearness if the formulæ were suppressed.

In the chapters which we have characterised as the appendix, a very detailed account of Frankland's method

of water analysis is given, and there is a very meagre account of the ammonia-process of Wanklyn, Chapman, and Smith. Probably the author would urge in justification of the course he has followed, that the ammonia process is so well known that there is little occasion to describe it in a book such as the present, and that the Frankland process being practically unknown requires detailed treatment.

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

THE PORTSWOOD SEWERAGE WORKS.

(*To the Editor of the* SANITARY RECORD.)

SIR,—By the courtesy of the borough surveyor, a member of the local sanitary board and myself were invited in October last to inspect the new sewage works at Portswood. Establishments where the sewage of populous districts is manipulated are naturally associated in the mind with disagreeable things, but visitors to this one will be astonished at the complete absence of nauseous odours, and the entire freedom, as far as regards the irrigated land, from any appearances of the treatment to which it is subjected, but all this is plain enough when the process adopted is thoroughly understood. The sewage is allowed to flow into and along a series of sunken brick-lined subsidence troughs, so placed side by side as to take up as little room as possible; here almost the whole of the solid matter is deposited by gravitation, and the liquid flows on through a small filter bed, composed of charcoal and shingle, about six inches in thickness, from which it issues clear, bright, and free from odour. A bottle of this filtered sewage is quite indistinguishable to an ordinary observer from water, and in appearance is far better than some samples of so-called drinking water submitted for analysis. Of this admirable arrangement for the separation of the solid from the liquid, there is a duplicate, so that it is an easy matter when the filter ceases to act, which in practice, is found to be about once a week, to direct the flow of sewage into a clean set of troughs and filter bed. Meanwhile the first set is cleared of the solid excrementitious matter which has subsided and which soon dries up. When dry this solid matter gives off no perceptible odour, or if so can be covered with an inch of earth and so completely deodorised. Of course, this is a valuable manure, and can be either carted away or used on the adjacent land. The fluid, after filtration, an analysis of which I give below, is allowed to flow into a simple system of small canals and caused to irrigate the land and to percolate through the soil. The soil, being peaty and porous, is well adapted for the purpose, and vegetables of most kinds thrive upon it. These take up and assimilate a portion of the sewage which is at the same time good for vegetable and bad for animal life. The sewage water, after having percolated through the soil, drains off and falls as a perfectly clear effluent into a large ditch, where it remains until low water, when the whole is allowed to flow into the river. At the time I saw this reservoir it contained about sixteen inches of effluent, and in this the little fishes and shrimps were active and healthy, and evidently did not know it from any other tidal ditch. This is not a new method of treating sewage, but the duplicate arrangements of all working parts of the apparatus, by means of which a sudden stoppage if encountered would be of no importance, and the exceeding simplicity of the same, the latter being an attribute absolutely essential in such cases where success is looked for, is due to the ability and practical knowledge of our borough surveyor. Furthermore, the chemical analyses bear undeniable testimony to the admirable results obtained. The promoters of these drainage works do not declare them to be an establishment founded only to economise sewage; much, however, of the valuable manurial properties of the sewage of Portswood will, for the future, be utilised. The district is well drained, and the river Itchen is saved, to a great extent, from further pollution. The results of the analysis are as follows:

Liquid sewage after treatment by subsidence and filtration.

	Grains per Gallon.
Total solids	31·1500
Chlorine calculated as common salt	7·7000
Albuminoid Ammonia	0·1254
Free Ammonia	0·7364

Effluent as allowed to flow into the Itchen.

Total solids	77·5000
Chlorine calculated as common salt	19·1000
Albuminoid ammonia	0·0686
Free ammonia	0·4018

—About 50 per cent. of the organic matter is got rid of, and its place is taken by common salt and other mineral matter dissolved from the soil. The bulk of the organic matter having been allowed to subsidise in the early part ot the treatment, leaves a clear liquid sewage, from which an effluent is thus obtained which may be safely allowed to flow into our tidal waters. ARTHUR ANGELL.

Hants County Laboratory,
Southampton.

Sanitary Invention.

LLOYD'S PATENT IMPROVED VENTILATOR.

THIS apparatus was awarded a certificate of merit at the Manchester and Salford Sanitary Exhibition. It is exceedingly simple in construction, but thoroughly efficient in action, and belongs to the class of ventilating apparatus without moving parts. The patentee has fixed it in a large number of public buildings and private dwelling-houses, and received many testimonials respecting

its efficiency, to which we can also testify from personal observation of its action. By a specially arranged modification, it is readily adapted to the ventilation of shafts from drains and sewers, as well as for railway carriages, and other public vehicles. It may be also used as a chimney-cowl, and possesses the advantage in this position of not becoming useless in a short time from the accumulation of soot. It is neat and compact in appearance, and

may be used for all purposes to which ventilators are applied. When adapted to the ventilation of apartments or public buildings, it should be used in connection with some form of inlet ventilator preferably with Tobin's system. It effectually prevents down draughts with their attendant unpleasant and often serious results. It may be depended upon to do its work equally well in all weathers, and cannot be affected by snow nor admit rain. During the tremendous gale of Sunday, the 14th ult., we had an opportunity of trying the effect produced by the passage of a strong current of air through the ventilator. Its action remained perfect, exhausting the air, but the most carefully applied tests failed to show the existence of the slightest down draught. From the simplicity of construction which characterises this apparatus it is produced at a very economical rate, and on this account recommends itself to all who desire to combine efficiency and durability with a reasonable first cost. Mr. Lloyd, of Winchester, is the manufacturer and patentee.

Notice of Meeting.

SOCIETY OF PUBLIC ANALYSTS.

AN extraordinary general meeting will be held at Burlington House, Piccadilly, on Friday, December 7, at five o'clock, to receive the report of the Council, with reference to the resolution of May 3, 1876, as to the question of changing the name of the Society, and to pass any resolution thereon. It will be proposed to alter the name of the Society, by omitting the word 'Public.' A special general meeting will be held at the same time and place, to consider the amended report of the Council, in reference to the replies to be made by the Society, to the questions submitted by Dr. Rottenburgh, on behalf of the German Government. Mr. A. Anthony Nesbitt will be proposed for election as member. The Council has recommended the following gentlemen for nomination as Associates: Mr. F. W. Gear and Mr. W. J. Williams, assistants to Mr. Wigner.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

BUTLER, Arthur, L.K.Q.C.P. Irel., L.R.C.S. Irel., has been appointed Medical Officer of Health for the No. 3 Sub-District of the Beaminster Rural Sanitary District, vice Clapcott, resigned.

CLAY, W. H., Esq., has been elected Chairman of the Hebden Bridge Local Board and Urban Sanitary Authority, Yorkshire, vice Horsfall, resigned.

CRUDEN, Mr. John, has been appointed Inspector of Nuisances for the Berwick-upon-Tweed Urban Sanitary District, vice Lawrie, resigned (but who continues as Surveyor), at 80*l.* per ann., for three years.

DAVIES, Lewis, Esq., has been elected Chairman of the Ystradyfodwg Local Board and Urban Sanitary Authority, Glamorganshire.

GOLDING, Mr. Samuel, Sen., has been elected a Member of the Newmarket Local Board and Urban Sanitary Authority, vice Kitchener, resigned.

HALL, Mr. William, has been appointed Collector to the Brandon Local Board and Urban Sanitary Authority, Co. Durham.

HODGER, Richard, Esq., has been appointed Treasurer to the Brandon Local Board and Urban Sanitary Authority.

JONES, Charles John, L.K.Q.C.P. Irel., M.R.C.S. Eng., has been appointed Medical Officer of Health for the Lower Division of the Ystradyfodwg Urban Sanitary District.

JONES, Mr. John W., has been appointed Surveyor and Inspector of Nuisances to the Ystradyfodwg Local Board and Urban Sanitary Authority, at 180*l.* per ann.

JONES, Mr. Joseph, has been appointed Inspector of Nuisances for the Newport Rural Sanitary District, Monmouthshire, vice Rees, resigned.

LLEWELLYN, Mr. Evan, has been appointed Collector to the Ystradyfodwg Local Board and Urban Sanitary Authority.

MIDDLEMAS, Mr. Robert, has been appointed Clerk to the Glendale Guardians and Rural Sanitary Authority, Northumberland, vice Wightman, resigned.

MORGAN, Mr. Walter, has been appointed Clerk to the Ystradyfodwg Local Board and Urban Sanitary Authority.

RHYS, Watkin, M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the Upper Division of the Ystradyfodwg Urban Sanitary District.

RUSSELL, Arthur James Forbes, L.K.Q.C.P. Irel., L.R.C.S. Irel., has been appointed Medical Officer of Health for the Worksop Urban Sanitary District, and Certifying Factory Surgeon for Worksop, vice Hett, deceased.

SPOOR, Mr. J. W., has been appointed Surveyor to the Brandon Local Board and Urban Sanitary Authority.

STEAD, Mr. John George, has been appointed Surveyor and Inspector of Nuisances to the Long Eaton Local Board and Urban Sanitary Authority, Derbyshire, vice Ridgway, resigned, at 175*l.* per ann.

STEAVENSON, Addison Langhorn, Esq., has been elected Chairman to the Brandon Local Board and Urban Sanitary Authority.

WILLIAMS, M. R., Esq., has been appointed Treasurer to the Ystradyfodwg Local Board and Urban Sanitary Authority.

WILSON, Mr. John George, has been appointed Clerk to the Brandon Local Board and Urban Sanitary Authority.

VACANCIES.

BEDFORD URBAN SANITARY DISTRICT. Inspector of Nuisances. Application, 12th instant, to Theed William Pearse, Town Clerk.

FREEBRIDGE LYNN RURAL SANITARY DISTRICT. Medical Officer of Health: 80*l.* per ann. Application, 13th instant, to R. H Oldham, Clerk to the Authority, King's Lynn.

PONTYPOOL. Certifying Factory Surgeon.

PONTYPOOL URBAN SANITARY DISTRICT, Monmouthshire. Medical Officer of Health.

PORTSEA ISLAND GUARDIANS AND RURAL SANITARY AUTHORITY. Clerk.

PORTSMOUTH, CORPORATION OF, AND URBAN SANITARY AUTHORITY. Surveyor.

SANITARY PATENTS.

3567. An improved apparatus for preventing the escape or ingress of sewer gas or noxious effluvia from drains into dwelling-houses or other buildings. William James Baker, Wakefield, Yorkshire.

3570. An improved ventilator and smoke extractor. Richard Searle, Cheltenham, Gloucestershire.

3571. Improvements in treating and utilising sewage and other refuse or waste matters; also in apparatus or arrangements therefor; and also in making preparations of lime therefor, and applicable to other useful purposes. James Gray, Glasgow.

3573. Improvements in the means of and apparatus for cleaning, washing, or scouring fabrics or garments of all kinds. Fernand Dehaltre, Boulevard Saint Denis, Paris.

ABSTRACTS OF SPECIFICATIONS.

494. Electric lamps, etc. P. Jablochkoff.

An 'electric candle' is formed of two parallel rods of carbon separated by a compact insulating substance difficult of fusion, as kaolin, in which they may be embedded. The lower ends of the carbons are held in pieces of copper tube, separated by asbestos, and the ends of these tubes are pinched between two limbs of a screw vice; the whole is placed in a non-conducting base. Colouring matter for the light may be introduced into the insulating material. Several lamps may be placed in one circuit.

528. Filters. E. Parrett.

This relates to improvements on No. 2060 of 1874. The filtering apparatus (which is made of a series of perforated lenticular chambers, having a common axis and communicating with each other, the whole in a loosely fitting bag of filtering fabric), is arranged so that it can be raised above the level of the liquid in the cistern, and then rotated to throw off solid matter.

781. Lids for sanitary receptacles. B. Shaw.

The lid is made so as easily to enter the top of the tub, and it has an india-rubber ring, which by means of curved segments and cams actuated by a handle in the centre, can be forced outwards against the inside of the tub.

'THE DUPLEX CAR is the lightest, prettiest, best constructed, and best appointed car that has ever been brought under our notice.'—*Church Review.* Inventors, Patentees, and Builders S. HATCHARD & Co., General Funeral Furnishers, 47 Crawford Street, W. Miniature Duplex Cars (used open or closed, drawn by men or horse) built for the country.—ADVT.

NOTICE.

THE SANITARY RECORD *is published every Friday morning, and may be ordered direct from the Publishers. Annual Subscription, 17s. 4d.; free by post, 19s. 6d.*

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Original Papers.

BREAD AND BREAD STUFFS.

BY BERNARD DYER, F.C.S., Member of the Society of Public Analysts.

II.

IN our last article on this subject we considered the relative nutritive and economic value of the various meals yielded by the cereals—including wheat, oats, barley, rye, maize, and rice—as well as of those afforded by certain leguminous plants—peas and beans—making, also, some brief remarks on the comparative merits of purely farinaceous foods, such as the arrowroots and 'cornflour.'

It is now purposed to devote a few pages to the discussion of the manufacture and baking of bread. As already pointed out, the term 'bread' may be strictly speaking extended to the designation of all baked substances prepared from the kneaded dough of any of the meals to which we have above alluded, and does not necessarily imply a fermented or aerated article. In conformity, however, with the all but universal custom in this country, we shall—unless otherwise specified—restrict the name 'bread' to the familiar substance prepared from the fermented or aerated dough of wheaten flour.

It is not necessary at present to enter into a description of the various processes employed in grinding the raw grain, the comparative composition and properties of the several materials—bran, pollard, flour, etc.—into which the ground grain is separated by the miller, having been already sufficiently touched. As will have been seen, the more strictly nutritious constituents of the wheat, *i.e.* the gluten, oil, and mineral matters, are mainly situated in the exterior portions of the grain, adjoining the husk or integument, with which they are to a great extent eliminated—the result being that the coarser the flour, the more directly nutritious, the same argument naturally applying to the bread in which it may be incorporated. Hence coarse brown bread is, though less digestible, much superior in feeding value to the best white.

We shall now briefly describe the chief steps in the preparation of bread, stating as concisely as possible the theoretical or chemical explanation of the action of each. Ordinary fermented bread naturally claims priority, after which artificially aerated bread will receive due attention. By 'artificially aerated' bread is meant bread which, without having undergone any real fermentation, has nevertheless received by artificial means the requisite aeration, to impart which is the principal object of the fermenting process. It is not unusual to speak of such bread simply as 'non-fermented,' but as this description is equally applicable to such dense preparations of flour as ship's buiscuits, we shall here employ the term 'artificially aerated.' It is, perhaps, scarcely necessary to say that the object of all aeration—whether by fermentation or otherwise—is to impart porosity and lightness, rendering the constituents of the flour more readily subject to the action of the gastric juices, and therefore more digestible and more directly nutritious.

Fermented Bread.—The earliest fermented bread of which we have any account, is that made by the process of 'leavening,' which, in this country, at all events, may be said to have practically fallen into disuse. It consists—or consisted—in putting aside a portion of kneaded dough until spontaneous fermentation set in, the fermentating dough being termed 'leaven.' A small portion of this 'leaven' mixed with a large quantity of fresh dough, is capable of setting up, more or less speedily, fermentation throughout the whole mass.

The so-called 'panary' fermentation of dough, is a true alcoholic fermentation, its action being as follows:—The 'ferment,' or substance inducing fermentation is the nitrogenous gluten. This on exposure for some hours in a moistened state, at a warm temperature, undergoes a partial decomposition, in virtue of which it converts a considerable portion of the starch of the paste into the peculiar variety of sugar known to chemists as glucose. The glucose thus produced then undergoes transformation into alcohol and carbonic acid gas, as shown in the following chemical reaction:—

Glucose.		Alcohol.		Carbonic acid gas.
$C_6H_{12}O_6$	=	$2C_2H_6O$	×	$2CO_2$

The carbonic acid gas being slowly liberated, makes it escape into the air through the substance of the dough in minute bubbles, expanding and lightening it in every direction. The use of 'leaven,' as just said, has all but disappeared in this country, the substitute almost universally employed for inducing fermentation, being brewers' yeast—a well-known material consisting of an aggregation of minute corpuscles of fungoid or vegetable growth. The dried or compressed 'German yeast' is also much employed for a similar purpose. The yeast is worked up with the necessary quantity of flour, salt, and water, into a dough, which is allowed to rest for awhile, and is subsequently thoroughly 'kneaded' to ensure the equable distribution of the fermenting action. After a further rest, it is divided into loaves and baked in an oven, the heat of which is skilfully regulated in order to obtain the simultaneous results of a thin, crisp, unburnt crust, and a mass of crumb thoroughly baked to the centre, so as to present a consistency neither 'doughy' nor yet too friable. The alcohol produced by the fermentation simultaneously with the carbonic acid, is entirely dissipated by the heat of the oven. It was estimated, twenty years ago, that the annual consumption of bread, in London alone, implied the evolution of more than 300,000 gallons of alcohol in the ovens of the metropolitan bakehouses. Assuming a value of 19*s.* a gallon, this would represent a sum of 285,000*l.* per annum. The present consumption of bread with our enormously increased population would of course give figures of far more formidable proportions. Various attempts have been made from time to time to condense and collect some portion of this spirit, but with no marked success. Whether any appreciable portion of the value of this vast quantity of alcohol—literally a 'waste-product'—will ever be realised, yet remains to be seen.

Such is an outline of the ordinary process of bread-making, before leaving which, however, it will be not uninteresting to refer to certain causes of bad quality in bread, which may be said to be independent of defects in the operations of the bakery. Barley, as is well-known, when subjected to the 'malting,' process, for use in the brewery or distillery, is allowed to germinate in a warm temperature, the action of germination being accompanied by the conversion of the albuminous matter of the grain into a substance called 'diastase,' and the simultaneous

conversion of part of the starch into dextrin and glucose or maltose—a peculiar form of sugar. Now a similar action is set up in wheat if allowed to remain too long in the field, or if subsequently stored in a warm damp granary and the flour prepared from grain partially so 'converted' is incapable of producing a good bread, since the diastase induces the formation of a larger quantity of sugar than is desirable. Besides losing much of its lightness and porosity such bread has a 'flat,' sweetish, unpleasant flavour, and a somewhat dark colour. The fault, however, is not always with the farmer, as the careless storing of sound flour after leaving the mill will often favour the formation of diastase to the serious detriment of its bread-making qualities. Now it was found out long ago by both millers and bakers, that there was a very simple and readily accessible means of treating damaged flour, whereby the bread produced from it might be made to simulate the consistency, taste and appearance of bread from sound flour. This consisted in the addition of a substance which checked the action of the diastase on the starch, preserving the latter from conversion into dextrin and sugar. Not only was an apparently wholesome condition of the loaf brought about, but an increased immunity from sourness was at the same time ensured. The substance possessing these remarkable properties was alum—the use of which thus enabled the miller to palm off his damaged flour upon the baker, or else enabled the latter to purchase at a low price flour of acknowledged inferiority, and to bake it into 'first-quality' loaves. Much controversy has from time to time arisen on the subject of the effects of alum on the constitution, if daily consumed in bread. Some medical men have asserted its harmlessness, while others have pronounced strongly in its disfavour. Even in such small quantities alum has been declared to produce constipation owing to its astringency; but the strongest argument against its use in bread for purposes of preservation is probably that of Dr. Dauglish, who very properly argues that its efficacy in the prevention of the solution and decomposition of starch in the loaf itself, will be more or less continued in the stomach; for the alum, while neutralising as it does, the action of the diastase, will further neutralise the action of the gastric juices, the result being imperfect digestion with the consequent elimination from the system of substances which should otherwise meet with ready assimilation as true food, including a large proportion of gluten and 'unaltered' starch. Alum, moreover, retards the action of yeast, as well as that of diastase, and on this account a substitute has been found in lime-water, which protects the starch from the action of diastase without materially influencing the yeast fermentation. While altogether a less objectionable substance than alum, its use must nevertheless be discountenanced by those who maintain that bread should be prepared from sound and healthy wheaten-flour, and not from a sour, mouldy, or damaged article. Owing to the operations of the Sale of Food and Drugs Act, the addition of alum to bread is becoming rarer, bakers preferring to buy sound flour and forego their former illicit profit, to running the risks of penalty and exposure in the police-courts.

Sulphate of copper, or blue vitriol was at one time used abroad to a considerable extent in the adulteration of bread, for the same purposes as alum. The quantity introduced into each loaf was certainly small, but the addition to articles of food, even in minute quantities, of poisonous mineral substances, like copper, should be unhesitatingly treated as a criminal offence.

The presence of potatoes in bread, which has frequently called forth discussion, is by no means always a sign of adulteration. That mashed potatoes have been habitually added to fraudulently increase the weight of bread, there is no doubt; since, however, very many bakers 'start' the fermentation by adding yeast to a small 'mash' of potatoes and subsequently incorporate the same with their flour, simply for the sake of convenience, it would be obviously harsh to deem the mere presence of a small percentage of potato starch an adulteration.

Brown bread has been already referred to as more nutritious, but less digestible than white. It has also been pointed out that the latter difference only influences persons of delicate digestion, but it may nevertheless be of interest to point out the cause of the comparatively inferior digestibility of brown bread. In the coarser kinds, as shown in our previous article, this is in great degree due to the preponderance of cellular or woody fibre, but it is also in some degree referable to a chemical action akin to that which occurs in the case of damaged flour. The albuminous matter of the bran is particularly liable to undergo the 'diastase' transformation, previously alluded to as occurring in the whole grain of ill-stored or damaged wheat, the diastase, as in the latter case, acting on the starch, converting more than a due proportion of it into saccharine matter and so rendering the loaf somewhat 'clammy,' less porous, and therefore less digestible than well made sound white bread. The dark colour of brown bread is also attributable to this action rather than to the actual presence of the fine bran.

Artificially Aerated Bread.—In the various kinds of artificially aerated bread, the gas used to expand and lighten the dough is identical with that produced in natural alcoholic fermentation, namely, carbonic acid. The mode by which this gas is disengaged, however, varies considerably, since in certain processes it is actually generated in the dough itself, while in others it is introduced into it in a simple state of solution in the water with which the flour is mixed. The last-named process is that which is probably best known, its inventor being Dr. Dauglish, whose name it bears. Water is strongly charged with carbonic acid gas under pressure, as in the manufacture of soda water. While still under pressure a portion of the charged water is mechanically kneaded with the flour into dough, the result being that on removal of the pressure the gas expands and escapes through the substance of the bread, minutely aerating every part. The dough is weighed into loaves and baked—'rising,' of course, still further owing to the increased expansion of the residual gas in the heat of the oven. The production of the carbonic acid costs but little, the sole reagents necessary being a supply of whiting or fine chalk and sulphuric acid. The quantity of carbonic acid required for the thorough aeration of the dough prepared from 280 lbs. of flour is about 20 cubic feet, measured at the ordinary pressure of the atmosphere; not that the whole 20 feet pass through the substance of the dough, nearly half being wasted, more or less accidentally, in the mixing, etc. It may, therefore, be roughly assumed that about 7 lbs. of sulphuric acid and 10 lbs. of carbonate of lime

(chalk or whiting), suffice for the conversion into bread of 280 lbs. of flour.

This process certainly presents some obvious advantages over the usual fermentation method. Putting aside its superior cleanliness, owing to the employment of entirely mechanical means in mixing, kneading, etc., its rapidity is a material recommendation, seeing that considerably less than two hours will suffice for the conversion into bread of a whole sack of flour, no rest being necessary, since there is no fermenting action to be promoted. The dietetic quality of this bread is spoken highly of by many persons, including eminent physicians, but it has also been pronounced somewhat insipid as compared with ordinary bread. This is of course a matter of taste, on which any two people may disagree, but any slight insipidity that it may possess is very likely referable to an important fact in the constitution of artificially aerated bread, which is considered to give it an advantage over that which has been made by fermentation. It will be remembered that the process of fermentation depends upon the partial destruction of the starch of the dough, with the formation of dextrin and the saccharine principle glucose, the latter of which becomes in great part decomposed into carbonic acid and alcohol, sufficient remaining, however, to impart an almost imperceptible sweetness to ordinary bread. In artificially aerated bread we have no fermentation, and consequently no destruction and loss of starch; hence, probably, the trifling insipidity alluded to, which ought therefore perhaps to be regarded as rather advantageous than otherwise. Brown bread may be prepared most satisfactorily by artificial aeration, for as there is no addition of yeast, and no time for spontaneous fermentation, the albuminous constituents of the bran fail to exert the powerful influence of which they are ordinarily productive upon the farinaceous substance of the loaf. Thus the exaggerated formation of sugar previously mentioned as occurring in ordinary brown bread, spoiling to a certain extent its lightness and other physical qualities, cannot well take place in that prepared by 'Dauglish's' system. We are therefore by this means enabled to prepare a brown loaf which, in addition to its superior flesh-forming properties, possesses no degree of heaviness or indigestibility over and above that necessarily and naturally conferred by the additional proportion of cellular fibre and woody matter of the grain. There is also an advantage possessed by artificial aeration which is in one sense counterbalanced by a consequent disadvantage. Should it be proposed to make a batch of loaves of ill-conditioned flour, it is possible—if there be nothing objectionable in the appearance of the latter—to work it up into fairly good-looking bread without recourse to the introduction of alum. The avoidance of the alum is clearly an advantage to the consumer. It is also an advantage to the baker, who uses his cheap flour without having recourse to a practice which will subject him to the fear of a police-court prosecution. The counterbalancing disadvantage is on the side of the consumer, who must weigh against his immunity from alum his liability to be served with bread from inferior flour. The process, however, is not such as can be conveniently carried out in small bakeries, and those who are likely to undertake the manufacture on a wholesale scale would probably scarcely think it worth while to have recourse to such questionable means of profit, seeing that their object is naturally to gain as good a reputation for their bread as possible.

Baking Powders.—Long before the invention of Dr. Dauglish's process of aeration, several methods had been introduced for the artificial liberation of carbonic acid gas in dough. Thus it was proposed by Dr. Whiting, in 1837, to mix carbonate of soda with the flour, making the whole into dough with water containing just sufficient hydrochloric acid to combine with the alkaline base, forming chloride of sodium or common salt. The carbonic acid, previously in combination, is thus set free, and escapes in the dough. This process of aeration is not altogether satisfactory, since the hydrochloric acid acts with too great an energy upon the carbonate of soda, causing too rapid an evolution of gas, the result being that the bread is apt to be perforated with large cavities (caused by bubbles of carbonic acid), the walls of which are more or less of a tough doughy consistency, never having been subjected to the lightening influence of the gas, which has escaped in large quantities at a time instead of thoroughly permeating the whole loaf. The large proportion of common salt produced is another objection to the use of hydrochloric acid, as the flavour of the bread is thus more or less deteriorated. The most serious charge, however, that has been brought against the method is the danger arising from the possible use of impure acid. The muriatic acid of commerce is frequently contaminated to a serious extent with arsenic; indeed, it is only the superior acid prepared for medical and chemical use that can be guaranteed free from this impurity. As it is unlikely that more money than necessary would be expended by the baker on the purchase of his acid; and as arsenic, even in minute traces, is not desirable in bread; and as, moreover, a very skilful measurement is required in adjusting the proportions of acid to those of alkali, to prevent undue excess of either substance, this process, though ingenious, does not, on the whole, appear to have deserved very great success.

An entirely volatile substance—sesquicarbonate of ammonium—has been from time to time used for the aeration of bread, and more particularly perhaps of cakes and similar articles of confectionery. It is finely powdered, and mixed with the flour before the dough is prepared. On subjection to heat, it decomposes, as shown in the following equation, into carbonic acid, ammonia, bicarbonate of ammonium, and steam—gaseous substances which are practically entirely dissipated during baking:

$$(NH_4)_4\,H_2\,(CO_3)_3 = CO_2 + 2\,NH_3 + 2\,(NH_4)\,HCO_3 + H_2O.$$

The most successful inventions for the artificial generation of carbonic acid in dough are, however, those in which the gas is liberated, as in the case already referred to, from an alkaline carbonate by the action of a stronger acid. The objections above enumerated having been raised to the employment of hydrochloric acid for this purpose, it was subsequently proposed to make use of a vegetable acid, which, without containing any dangerous impurity, should be less energetic in its action than hydrochloric acid, and at the same time equally efficacious. The acid chosen was tartaric acid, a substance ordinarily used in the form of a white crystalline powder. This is mixed intimately with the requisite proportion of bicarbonate of soda—a salt yielding twice as much carbonic acid gas as the ordinary

carbonate—and this mixture may be retained indefinitely without undergoing decomposition, provided no moisture be suffered to come in contact with it so as to bring either of the ingredients into solution. Such a powder can be thoroughly incorporated with the flour, and will, when the latter is formed into dough, produce a sufficiently uniform but not too brisk an evolution of gas to effect thorough aeration.

Such mixtures of tartaric acid and bicarbonate of soda form the bases of most of the baking powders sold under various names, though these are occasionally mixed with other substances of a flavouring nature—such as sugar, salt, etc., according to the purposes for which they may be required. Their use in the preparation of articles of confectionery is rapidly increasing, and is undoubtedly of advantage from an economical point of view in reducing the consumption of eggs.

Bread made with baking powders is usually of very good quality, and has—for reasons which have been already entered into—a whiter colour than fermented bread. It is, however, somewhat deficient in lightness as compared with fermented bread made from the finest quality of wheaten flour, and must be pronounced, in many cases, inferior to the aerated bread of Dr. Dauglish. As in many other matters, however, much, no doubt, depends upon the skill of the baker in adjusting his proportions of baking-powder and in thoroughly mixing them with the flour, as well as upon the care of the maker of the powder, in selecting and combining its various ingredients.

While it must be admitted that baking-powders and other means of artificial aeration are likely to gain still further ground, it seems nevertheless highly improbable that they will ever supersede to any comparatively great extent the old-fashioned process of natural panary fermentation. Fermented bread has yet to be proved practically inferior to artificially aerated bread in dietetic value, though scientifically speaking, the latter should, for equal weights of flour, be more nutritious. In the majority of cases, we may in all probability disregard the doubts and fears advanced from time to time in medical quarters concerning the unwholesomeness of the residual yeast in the baked loaf; for in carefully prepared and properly baked bread, no bitter taste or other objectionable qualities are necessarily imparted by the yeast. As a means of rapid and ready conversion of flour into wholesome bread, aeration both by means of 'carbonated' water, and of baking-powders, is probably destined to grow rather than to diminish in favour among both bakers and the public generally, although at present the popular preference is decidedly in favour of fermented bread.

METROPOLITAN PURE SEA-WATER SUPPLY.

V.

ALTHOUGH this subject is one of engrossing interest to those engaged in elucidating it, and making it easily understood to the general reader, and could be continued indefinitely, yet the intention may now be considered as accomplished without trespassing too far upon the patience of those who have followed the reasoning from the beginning, tending to show why London should have an abundant supply of pure sea-water all the year round, at an early date. A short recapitulation of the chief points of the subject will here be useful. It has been strenuously maintained that the supply must be undertaken on a scale large enough to satisfy all London. The Metropolitan Board of Works would prove themselves the most competent authority to deal adequately with a design of so extensive a character, and their ample powers would give them facilities for carrying out works, and laying mains and services that no private company could wield although fortified by Act of Parliament, which must be obtained under any circumstances.

The general description of the necessary works between the sea and London is sketched, indicating only one pumping station, and one reservoir, and the difficulties attending the laying of mains through the streets of London, with the proposed mode of crossing the Thames, are adverted to. The general distribution to be by meter at each dwelling or establishment, without cisterns and with constant supply day and night. The total estimated quantity of water that would be used daily by fifty miles of country, and London would, it is estimated, amount to about 7,000,000 gallons, and the low price would put the supply within the reach of all practically speaking. The estimated cost of necessary works to provide the total daily quantity above stated would be in original outlay 1,500,000*l.*, and annually about 90,000*l.*, and the income has been calculated to amount to 10 per cent. profit. The necessary funds could be more easily obtained by the Metropolitan Board of Works, the profits would accrue to the ratepayers, and the charge for sea-water could eventually be reduced at least 20 per cent. that is from 2*s.* 6*d.* to 2*s.* per 1,000 gallons under their management. Aquariums in London would prosper with a daily constant supply of pure sea-water, at a cheap rate, flowing through them. Swimming would also become more common, and indeed should become compulsory upon the rising generation, in an element so easy to learn in as sea-water would prove.

The expenditure of from 5,000,000*l.* to 10,000,000*l.* sterling in obtaining another supply of potable water under great pressure is earnestly deprecated, and more compulsory filtration on the part of some of the existing water companies recommended, by increasing the size and number of their filtering beds and imposing heavy fines upon the companies convicted of supplying impure water until their works become the property of the Metropolitan Board. The sea-water being under great pressure could be utilised for extinguishing incipient fires, and on that account alone would be invaluable in any house possessing it. The supply would generally be within the reach of 40*l.* householders, and cost them no more than 2*l.* 10*s.* per annum. The London swimming-baths would absorb probably about one-seventh of the total supply. The pumps and mains can supply 2,000,000 gallons more to towns, etc., on the route. All classes would greatly benefit in health by the introduction of this supply, and the death-rate would diminish.

The foregoing *résumé* of the most salient features of this design and its innumerable advantages may be accepted as necessary at this stage, to stamp them indelibly on the mind and bring out more forcibly in one article what may have been partially forgotten in an irregular succession of them. The general conclusions arrived at after patient and prolonged investigation are defined in the following sentences on the subject.

It has already been remarked that the combination of immense benefit to London, and the profitable nature of the undertaking to produce that permanent benefit, should weigh with the Metropolitan Board of Works in accepting the scheme which they are in so much better a position to carry out successfully than any company organised solely for the purpose would be. The proposal of Mr. Leslie, one of their members, to pump sea-water from the Thames to Langdon Hill, Essex, a height of 384 feet above the sea, whence it would flow by gravitation to London, was justly enough set aside as inadmissible; but if this proposal were to be brought before the board under the anspices of their chairman, it would but receive its due, by undergoing a thorough discussion from competent men who have the sanitary welfare of 4,000,000 of people under their direct control. The universal desire will be without doubt to improve the sanitary condition of London as much as possible, and here is offered one great means of effecting an improvement on a gigantic scale at a comparatively moderate outlay, which outlay will not be unproductive, but is calculated to return a profit of 10 per cent. per annum. Even if there should be no money profit arising from the undertaking, we must consider the enormous gain most certain to accrue in the improved general health of all London by the use and distribution of so great a quantity of sea-water daily. It may be unhesitatingly stated that the Board, with a feasible project before it, would obtain the support of all sensible and influential people in London. Companies are becoming too much a promoters' affair at the present day, and somehow the money that should be expended in construction is wasted on other purposes. This could not be the case with the Board of Works, and the introduction of this immense boon to all London would most decidedly ensure its future healthier state, and the supply would to a certainty be always in a good working solvent condition under their care, and the sea-water rates would be annually diminishing, whereas, under a company, there would probably be found at any time sufficient grounds for increasing them without scruple. It is quite clear, therefore, that the works could be undertaken and conducted more economically by the Board than by a company, and the public would assuredly be at all times better served. If it is considered necessary that all the water companies in London should be bought up and merged in the Metropolitan Board of Works, how much more essential is it that a great undertaking like this, entirely for the benefit of London, should also be under their direct control from the beginning, when it can be completed and managed so economically by them in the immediate interests of the public instead of by a company in the interests of their shareholders? It would be far preferable for the Board to inaugurate this supply under their own sole management than to permit a company to squander money on the execution of the works, and then buy them up at an enhanced figure upon their already too liberal outlay, after a few years probably unsatisfactory working for the public benefit.

There can be only one opinion as to the expediency of carrying out this, on every ground, most desirable undertaking calculated to bring about so great a sanitary improvement to this mighty city under the direct control of the Metropolitan Board of Works, and their immediate consideration of so important a matter is seriously and earnestly invited. Whenever their representatives are showing themselves interested in a subject of so much importance to all London, and that means more or less to all England, the public will awake into life about the matter quickly enough. The arguments in favour of their taking up this proposal in the first instance for the purpose of thorough investigation are to my mind quite conclusive, and it would be far preferable for those entrusted with the power of originating and executing sanitary and other improvements to enter upon this subject of their own accord, instead of waiting until the agitation respecting it had gained force in the public mind.

The admitted fact of the immense benefit to London at so economical although large an outlay, which will surely prove remunerative, with the certain increase to the health of an enormous population resulting from the introduction of a pure sea-water supply, should outweigh any and every other consideration that may be brought forward against the scheme. When London has successfully inaugurated this latest addition to sanitary improvements, many other important towns in England and Scotland will without doubt eagerly follow so good an example, especially when it is satisfactorily shown that it not only improves the general condition of the population, but is financially a great success, and will be the means of recruiting the funds of the corporation, and consequently relieving the ratepayers of a small portion at least of their burdens.

Taking a comprehensive view of the whole matter, it would appear that an original expenditure of one million and a half sterling, and an annual charge of 90,000*l.* would be required to introduce five million gallons of pure sea-water into London daily throughout the year, and two million gallons to the country between the sea and London. The plain question arises then, Is it worth so great an expenditure to produce such a result? and it may be unhesitatingly answered, a more profitable outlay could hardly be entered upon at the present time.

The money for the purpose could be borrowed at 4 per cent., and easily repaid out of revenue within fifteen years, without costing the ratepayers anything more than the interest for the first three years and perhaps not that, until the supply was brought into full working order. The outlay in the first year would be 500,000*l.* with interest 20,000*l.*; in the second year it would amount to a total of 1,000,000*l.* with interest 40,000*l.*; and in the third year the total outlay would be 1,500,000*l.* with interest 60,000*l.*, making a total amount of interest to be paid in the three years of 120,000*l.*, which sum might justly be added to the amount to be borrowed, which would then be 1,620,000*l.* The income would still pay 10 per cent. upon this sum, leaving 6 per cent. annually to clear off the principal, which could be done, allowing an ample margin for contingencies, in about fifteen years, leaving after that time a clear annual profit of 10 per cent. unencumbered. On the other hand, should the Metropolitan Board of Works decide, in accordance with public opinion, to proceed with the undertaking by levying an annual rate of 500,000*l.* for three years, there would be no interest to pay, and the whole income, after paying working expenses, would be clear profit from the beginning. This latter mode of raising the necessary funds would be the most economical way and most profitable to the ratepayers eventually, all of whom would then of necessity be deeply interested in the permanent success of the whole undertaking.

The debt of the Metropolitan Board of Works amounts to about 9,000,000*l.*, and it would not be sound policy to increase it, except on grounds of sanitary necessity. Whichever mode of raising the money for this great work is adopted, whether by loan or by annual rates for three years, no loss will accrue to the ratepayers in any way. On the contrary, the sanitary condition of London will be so much improved, and its general health so greatly increased through the pure sea-water supply, that the outlay in obtaining it will never be regretted, and it may safely be predicted that many other towns in the United Kingdom will gladly follow the good example set by the Metropolis in this matter of vital importance to the continuance of its sanitary prosperity, as already remarked. The Metropolitan Board of Works has effected a vast amount of good in constructing a grand system of sewerage, in building new bridges, in opening out new streets and thoroughfares through the slums of London, and in embanking the Thames and reclaiming land from the river mud-banks, and in improving London generally, all more or less works of sanitary improvement, and the prevention of disease. The introduction of an abundant household supply of pure sea-water under constant pressure would not only prove an immense benefit to all London in the improvement of the general health of its enormous population, continually fortifying them against infectious diseases, but a direct profit could be obtained from the careful and judicious management of the works under the control of the Board and its officers. Any design which can be shown to be profitable as well as immensely beneficial in a sanitary point of view, deserves the most serious consideration from those appointed to control all works undertaken for the general benefit of the Metropolis of the world. S. M'B.

THE

SANITARY RECORD.

FRIDAY, DECEMBER 14, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

INFECTIOUS DISEASES HOSPITAL FOR MAIDENHEAD.

IT is a great satisfaction to know that the various sanitary authorities in our land are fully alive to the necessity of speedily providing special buildings in which to house and treat those unfortunates who have been stricken down by contagious diseases. No matter what the accommodation may be, whether a wooden pavilion, a rough brick erection, or a less tentative structure, so that the earliest moment be seized and a due isolation enforced from other patients. The benefits which then accrue to the community at large cannot be fully estimated, and the only thing that requires careful study is the making choice of a building which, in its conception, is capable of localising the plague, and of minimising the danger. Whatever material is used in its construction, it should contain a proper apportionment of cubic feet space to each bed, and consistently ample ventilation. It should also include within its walls cooking—and washing conveniences, closet retirements within, and yet, so to speak, without, the building—suitable rooms for the nurses, and it should moreover be protected from the inroads of damp. For the rest, it ought to be so planned as to accommodate any future extension without necessitating any pulling down.

We are led to make the above few very cursory remarks in consequence of the great amount of attention which has been drawn to a proposed Infectious Diseases Hospital for Maidenhead. A short time ago prizes were offered by the urban sanitary authority for the best designs, the outlay being limited to the sum of 800*l.*, and the accommodations required being eight beds, with all the usual addenda of offices. It does not appear on what grounds this sum was fixed, or whether it was arrived at in any other way than merely from a knowledge of the fact that only so much money was to spare, but the result was an influx of nearly a hundred designs, some totally unsuitable, others partially so, and but a few at all worthy of examination at the hands of the judges. Eventually, a local architect was awarded the first premium, and his plan was chosen.

Of course the authorities were perfectly right to advertise for designs, and even exhibited a praiseworthy spirit in doing so; but in this case we have reason to fear that they failed to bring to the matter that careful study of the plans which their previous trouble would have led us to surmise, and that they were unassisted by skilled judges—men accustomed to hospitals, and able to realise even on a plan the full advantages or hidden dangers of the various arrangements. We have taken the trouble to examine three of the plans, namely, those by 'Ad Rem,' 'Serio,' and 'Thorough Ventilation,' and the conclusion which we have arrived at is that the design which received the first prize, and which was finally chosen is the worst of the three—is totally unsuitable for the housing of infected sick, betrays a serious ignorance of the essentials of even an ordinary hospital, and will hardly, we should think, be permitted erection by the local medical board. We do not say this in any way detractory of the successful architect's general ability; all we say is limited to the design before us, and we can but think that 'Ad Rem' cannot be complimented with the phrase of Plautus, '*rem acu tetigisti.*' We have no intention to follow our worthy contemporaries the *Builder* and the *Building News* in their valuable criticisms upon the exhibited designs, but selecting the two prize

ones of 'Ad Rem' and 'Serio,' pass a very few remarks upon each.

The faults of the chosen design are manifest at first glance. For instance, the kitchen, scullery, and bath room open immediately into the main corridor, and as a necessity the smell of cooking, and the steam from copper and bath must perforce pervade its atmosphere. This will be intensified—and dangerously so—when the scullery is in use as a laundry, for there is apparently no other convenience for washing and disinfecting. The two water-closets also open into the same corridor, with a close vestibule between, and the pantry opens into the small scullery. The patients would require to cross the common corridor to reach the water-closets, and this of itself is an egregious blunder. One of the wards too is so far removed from the nurses' room that a delirious patient would possibly suffer from inattention in consequence. The mortuary is, moreover, adjoining the convalescent ward. And as bad a feature as any is the want of proper cross ventilation in the wards, and the proposed extension of the wards by building the new ones close alongside without any intermediate space. The amount of cubic feet accommodation is especially faulty, there being only 858 cubic feet, with 78 square feet of floor to each bed in the sick wards.

The plan submitted by 'Serio' (Mr. Ernest Turner, of Bedford Row, London), is, in our opinion, as much to be commended as the other is to be condemned. It might safely be erected without the slightest alteration, and we feel sure that the medical authorities would compliment the borough upon its possession. It is the work of a gentleman who has made a special study of hospital construction, and the board have at all events shown that they thoroughly understand the proper essentials of a good hospital, in choosing it from amongst the remainder as worthy of a prize. We only wonder how it came to pass that a far worse design was eventually chosen—the design by the local architect. For as we have just said, the two will hardly bear comparison. As an example of the difference, we may state that the plan of 'Serio' provides 1,290 cubic feet per bed, with a floor-space of 100 feet. On his plan the kitchen is entirely separated from the corridor, and there is a proper laundry behind it away from the wards, and to which the foul linen can be carried without traversing the corridor. The earth-closets are also detached from the wards by an intervening lobby, and the patients can use them and the adjoining laboratories in perfect privacy. Here we see also a nurse's dormitory adjoining each ward, with a proper look-out; and should the whole of the eight beds be full, there is accommodation provided in an attic-room for an extra one. There are also stores for the matron, for the medical man, and for the cook; a dry earth-store for the closet service; and what is of great importance, a well-ventilated and conveniently placed bath-room. Should an extension be required at any time, it can be achieved by simply adding a bay or two to the male and female wards. The last good feature which we mention as regards this eclectic plan is the provision of a separate entrance for the patients of each sex.

We only exercise our proper function in criticising the strange decision come to by the Maidenhead Board, and must say in conclusion that we are absolutely at a loss to reconcile the certain appreciation which has been shown to manifestly the best design—that of 'Serio's'—with the infatuation which has led to a choice of the worst design. And if our few but earnest and well-meaning words could fall with due emphasis upon the ears of the judges, we would advise them, even at the loss of the already awarded premiums, to reconsider the plans, and to listen to the professional bias which has been imported into the case by interested observers who care only to laud what is wisest and best. The board may be certain of this, that the publicity which they have courted by advertising for plans will be extended to the judgment which they pronounce, and it behoves them as men standing in the sun to act fearlessly in the right. We even question whether the plan of 'Ad Rem' was fairly entitled to be considered at all, inasmuch as the stipulated sum was exceeded; but there may be reservations of which we are ignorant.

Notes of the Week.

AT a meeting of the Commissioners of Sewers on Tuesday last, a memorial was presented praying for the widening of Upper Thames Street.

THE Guildford Corporation and Urban Sanitary Authority have increased the salary of Mr. Russell, the Clerk, from 100*l.* to 150*l.* per annum.

AT a meeting of the Birmingham Town Council lately a sum of 10,000*l.* was voted for the laying out of a new park at Smallheath, one of the eastern suburbs, on land 40 acres in extent, and valued at 30,000*l.* which had been presented to the town by Miss Ryland.

THE Town Council of Dunstable have prepared plans for disposing of the town sewage on an irrigation farm, the cost of which is estimated to be 5,000*l.* The opponents of the scheme say it will cost 10,000*l.*, and advocate the ash-closet system, which, they urge, will only cost about 2*l.* per house.

A PUBLIC park, twelve and a half acres in extent, has been presented to the burgesses of Jedburgh by Mr. John Tinlin, a native of the town, now in New Zealand, and other members of the family. The park is situated close to the town, overlooking the beautiful valley of the Jed and the old abbey at Jedburgh.

THE following have been elected as the first Local Board and Urban Sanitary Authority for Ystradyfodwg, Glamorganshire, viz., Messrs. Evan Davies, Idris Davies, John Davies, William Davies, Lewis Davies, David Evans, Evan Evans, William Jenkins, Thomas Joseph, William Gibson McMurtrie, Moses Rowlands, and Edmund Thomas.

A FEW months ago Mr. J. N. Burns had the opportunity of examining several iron water-pipes which had been withdrawn from the pumping apparatus of a coal mine. Some of the pipes had lain under water and were externally covered with a semi-crystalline incrustation of impure carbonate of lime. This coating was closely and firmly attached to the surface of the pipes, and formed such a regular and imporous incasement as to preserve them to a great extent from oxidation or consumption by rusting.

A SHORT time since the Moretonhampstead (Devon) School Board passed a resolution prohibiting corporal punishment in the girls' and infants' schools, and in consequence the mistresses tendered their resignation unless the resolution was rescinded. The matter has since been discussed by the Board, and it was urged that girls and infants ought under no circumstances to receive corporal punishment. The Board resolved to adhere to their resolution, and to accept the resignations of the mistresses.

IN making gas for the lighting of London, a total capital of 11,000,000*l.* is employed. The total gas rental is 2,606,818*l.* per annum. The receipts for coke and breeze, coal-tar and ammonia, amount to 767,029*l.*, or 28 per cent. of the sales. The cost of coal—we are quoting the accounts for 1875—was 1,455,407*l.*, the quantity of coal carbonised having been 1,505,000 tons, of which 4 per cent. was cannel. The average net profits have been at the rate of 10*s.* 11·31*d.* per ton of coal carbonised, against a working expenditure of 12*s.* 3·47*d.* per such ton.

THE FACTORY DEPARTMENT.

CONSEQUENT upon the retirement of Mr. Robert Baker, one of Her Majesty's Inspectors of Factories, Mr. Cross has made some changes in the staff of the Factory Department. Mr. Alexander Redgrave, C.B., becomes chief inspector, with the sole responsibility of the administration of the department, and an additional assistant inspector has been appointed, Mr. James Henderson, one of the metropolitan sub-inspectors, being promoted to this office. The inspectorial staff of the department will in future consist of one chief inspector, Mr. Alexander Redgrave, C.B., five assistant inspectors—Mr. Alexander Walker, Mr. R. W. Coles, Mr. Frederick H. Whymper, Mr. R. E. S. Cram, and Mr. James Henderson—and forty-nine sub-inspectors.

THE BERLIN SEWAGE WORKS.

THE following data relating to the progress and cost of the famous Berlin sewage works are from the *Farmer* of December 3. The five radial systems now in hand will probably be completed by the end of 1881. According to the estimates thus far made and approved by the city authorities, 35,625,000 marks will be required for the establishment of the whole five, including the cost of laying down pipes to the irrigation fields outside the town. To this sum must be added the expenses of the latter, and of levelling and otherwise filling them for the purpose in view, as well as the cost of the branch pipes for the distribution of the sewage conducted thither by the mains. The collective outlay in this respect is estimated at 780 marks per morgen, and as some 6,240 morgen of land will be required for the reception and proper treatment of the sewage, a further sum of 4,867,200 marks must be forthcoming. The total cost, therefore, will be about 40,500,000 marks. Of this sum 24,000,000 marks have been already raised by loan, leaving nearly 17,000,000 marks to be still provided. Allowing that the produce of the sewage-irrigated fields may suffice to cover the expenses of maintenance of the works, Berlin will still be taxed to the extent of two million marks a-year for payment of interest on the borrowed capital, and provision of a sinking fund for the gradual extinction of the debt.

GREEN SYRUP.

SOME years ago an intelligent gentleman had occasion ot call, early in the morning, at a prominent pharmacy. Standing near the large and showy soda-water apparatus, which formed one of the principal features of the store, he chanced to observe some drops of a green liquid on the marble counter, under one of the syrup faucets. Somewhat surprised, he innocently inquired, 'What green syrup is this? Something new?' 'Oh, no,' replied the clerk, 'that's lemon. It's always green in the morning, after standing all night.' The clerk did not think it necessary to further explain that this beautiful green tint was due to poisonous contamination from the copper tank and brass faucets in which the syrup was contained? Such was the fact, however, and cases as bad as this are still unfortunately too common. The danger of metallic poisoning from the apparatus for dispensing soda-water lurks in precisely those parts of which it is the most difficult for the purchaser to examine and judge.

CORPORAL PUNISHMENT IN BOARD SCHOOLS.

MR. LUCRAFT writes to a contemporary to state that in the London Board schools there are full fifty girls and infant schools where no corporal punishment is inflicted, and from the reports of the inspectors the tone and order in them are, as a rule, excellent. Mr. Lucraft quotes from official reports from two schools, situate in poor districts, in which the fees are 2*d.* and 1*d.*; the numbers on the books of each are over 350 girls. In one there is no corporal punishment, and the inspector reports as follows: 'This school is admirably conducted by Mrs. ——— and her assistants. The instruction is very thorough, and the order, discipline, and tone are most praiseworthy. Percentage of attendance, 84.' The other school gives a return of about '170 inflictions of corporal punishment during the months of September and October, and the percentage of attendance only 69.'

THE REGISTRATION OF EPIDEMIC INFECTIOUS DISEASE.

THE following resolutions have been agreed to by the Society of Medical Officers of Health, in reference to the registration of epidemic infectious diseases: 'That in the opinion of the society, whenever a case of infectious disease occurs in any house or vessel, it should be a legal obligation on the person in charge of the house or vessel, or on the person in charge of the case, to report the fact to the sanitary authority without delay.' 'That it should be a legal obligation on every medical practitioner in attendance on any such case, to give immediate written information respecting its nature to the occupier or other person responsible for reporting it to the sanitary authority.'

THE following is a draft clause which it is proposed to insert in the new Edinburgh Police Bill, to be brought before Parliament next session, relative to the same subject: 'In order to secure more prompt action in dealing with infectious diseases, every medical practitioner practising within the burgh shall, within twenty-four hours of the same coming to his knowledge, report to the medical officer of health every case of typhus fever, typhoid fever, diphtheria, small-pox, scarlatina, and measles occurring in his practice within the burgh, under a penalty not exceeding 40*s.* for each failure, provided that such practitioner shall be paid the sum of 2*s.* 6*d.* for each case so reported by him; and, in order to facilitate the making of such reports, every practitioner as aforesaid shall from time to time be furnished with printed forms, addressed to the medical officer of health, and stamps for postal transmission.' The *British Medical Journal* believes the matter is shortly to be brought under the consideration of the Royal Colleges of Physicians and Surgeons, and it remains to be seen what course they will take in regard to it.

HYDROPHOBIA AND RABIES.

SIR THOMAS WATSON publishes a *résumé* of the latest information on hydrophobia and rabies in the *Nineteenth Century* for December. He points out that the disease is commoner than has usually been supposed by medical men, that it is invariably communicated from the saliva of a mad animal, that it sometimes takes six, seven, or more months to develop, and that it is, so far as known, incurable. The real preventative is immediately to cut out the part where the wound has been inflicted. Only a very few of those who are bitten by mad dogs are infected, and even among dogs Sir Thomas believes that a comparatively small number become rabid after they have been wounded by other animals in a rabid state. The disease is a most mysterious one. There can be no doubt that many persons have died from fear on the supposition that they had been bitten by a mad dog, and this is a kind of false hydrophobia, which, however, is easily distinguished from the true malady. When all hope is over Sir Thomas Watson advises a gentle euthanasia by the agency of chloral hydrate.

THE LONDON WATER-SUPPLY.

DRAFTS of bills for the purchase of the interests of the Metropolitan Water Companies, and for providing a new supply of water for drinking, fire-extinguishing, and other purposes, have been laid before the Metropolitan Board of Works. Mr. Roche, in moving that the preamble of the Water-Supply Bill be adopted, said the scheme was estimated to cost five millions, which would imply a burden of 225,000*l.* a year on the ratepayers, and this represented a rate of 2¼*d.* in the pound, from which ¾*d.* must be deducted for the present cost of watering the roads. But the special point he wished to indicate was that this outlay was at the rate of 4¼ per cent., whereas the water companies raised, upon a capital of about eleven and a-half millions, 1,232,986*l.* per annum, which was 10¾ per cent. The public would, therefore, by the transfer of the water-supply to the Board, gain the difference between 4¼ and 10¾ per cent. Mr. Leslie moved as an amendment, 'That, as the notices in the *Gazette* and London papers are at variance in most important particulars with the orders of the special board on Wednesday, November 14, 1877, the bill in its preamble and clauses is not the bill ordered on that day by the Metropolitan Board of Works, and must be abandoned.' This was negatived without discussion. A motion to adjourn the debate for a week was likewise rejected, and ultimately the preamble was passed, 22 voting for, and 17 against it. The clauses were then agreed to, and the bill was referred to the Parliamentary Committee, with instructions to take the necessary steps for promoting it in the next session. The purchase bill was similarly dealt with, the preamble and clauses being adopted by large majorities.

MODERN LIFE AND INSANITY.

DR. HACK TUKE, in the course of an article in *Macmillan's Magazine* for the current month, on the above subject, discusses the question—To what social class do the great mass of our lunatics belong, and to what grade of society does the striking apparent increase of the insane point? His conclusions are to the following effect: 'Looking broadly at the facts which force themselves upon our attention, we may say that a study of the relation between modern life and insanity shows that it is of a many-sided and complex character; that the rich and the poor from different causes, though certainly in one respect the same cause, labour under a large amount of preventible lunacy; that beer and gin, mal-nutrition, a dreary monotony of toil, muscular exhaustion, domestic distress, misery, and anxiety, account largely, not only for the number of the poor who become insane in adult life, but who, from hereditary predisposition, are born weak-minded or actually idiotic; that among the middle classes, stress of business, excessive competition, failures, and, also in many cases, reckless and intemperate living, occasion the attack; while in the upper classes, intemperance still works woe—and under this head must be comprised lady and gentlemen dipsomaniacs who are not confined in asylums; that while multiplicity of subjects of study in youth and excessive brain work in after life exert a certain amount of injurious influence, under-work, luxurious habits, undisciplined wills, desultory life, produce a crop of nervous disorders terminating not unfrequently in insanity. In a state of civilisation like ours, it must also happen that many children of extremely feeble mental as well as bodily constitutions will be reared who otherwise would have died. These either prove to be imbeciles, or they grow up only to fall a prey to the upsetting influence of the cares and anxieties of the world. A considerable number of insane persons have never been really whole-minded people; there has, it will be found on careful inquiry, been always something a little peculiar about them, and when their past life is interpreted by the attack which has rendered restraint necessary, it is seen that there had been a smouldering fire in the constitution for a lifetime, though now, for the first time, bursting forth into actual conflagration. Lastly, modern society comprises a numerous class of persons, well-meaning, excitable, and morbidly sensitive. Some of these are always on the border-land between sanity and insanity, and their friends are sometimes tempted to wish that they would actually cross the line, and save them from constant harass. When they do, it is easier to make allowance for them and their vagaries.'

MARLBOROUGH HOUSE.

WE are enabled to contradict, with authority the following announcement made by the *Builder* of last week, 'that soil from the old drains is actually *being dug into the ground and left there*, to save the expense of cartage.' The italics are not ours, but the sentence is printed as it appeared in our contemporary. The statement made by the *Builder* has caused the Prince of Wales much annoyance, and we cannot but regret that publicity has been given to a statement which we have reason to know is, so far as the basements are concerned, without a vestige of foundation. Mr. Robert Rawlinson, C.B., of the Local Government Board, and Mr. Taylor, of the Office of Works, made on Saturday morning a thorough inspection of the works in progress at Marlborough House. They closely questioned the foreman and other persons in charge, and they satisfied themselves that every tainted brick, and all soil and gravel found within the basement, have been removed. In all cases where excavations have been made fresh clean gravel and Portland lime concrete have been substituted for the old materials. That this part of the work has been both expensive and costly, will be manifest when we state that the whole area of the basement has been examined and tested. The *Builder* has confused the works in progress in the gardens with those connected with the house and its immediate precincts. That this is so may be gathered from the fact that some old drains have been taken up in the garden. The excavations made here, and the soil found in the drains, have, in some cases at any rate, been dug in by the gardeners, and so the origin of the statement is not far to seek. For our own part we are glad to find that in this case the Office of Works is not to blame, for no one will censure the mixing of tainted earth with garden soil. True to those conservative principles which have apparently animated the Office of Works from time immemorable, they have in this instance adopted the sanitary precautions which Moses enjoined the Children of Israel to adopt some thousands of years ago. We are gratified to hear that the Office of Works attach so much importance to the adoption of this novel sanitary code that, in order that the momentous secret may be guarded with judicious care, in addition to an army of watchmen, three special detectives have been told off for duty at Marlborough House.

Special Reports.

THE SEWAGE QUESTION IN GLASGOW.

THE report of the deputation appointed by the Town Council of Glasgow to inquire into the methods of disposing of sewage adopted in various towns in England describes these different processes at great length. The committee point out that they have given special study to the disposal of sewer gases, without which any general scheme for the purification of the river and the improvement of the city would be incomplete. The recommendations of the committee in reference to this branch of the subject are to the effect that water-closets in large works, infirmaries, etc., should be discontinued, so as to reduce the quantity of water-closet sewage turned into the river; that the ordinary privies and ashpits should be altered to the tub and pail system; that all drains and water-closet apparatus should be executed under public supervision; that a complete system of ventilation of common sewers and of house drains and soil pipes, independent of that of the common sewers, should be adopted; and that the use for dietetic purposes of water from cisterns supplying water-closets should be absolutely forbidden. In the event of a decision being arrived at to purify the Clyde, the committee declare in favour of filtration. They recommend—first, that the whole drainage of the city be conducted to a suitable point by means of main intercepting sewers, and after being rendered clear by precipitation and filtration, be passed into the Clyde; and second, that the sludge obtained in the precipitation process be got rid of in the cheapest possible manner. The committee discard the idea of utilisation of the sewage itself, believing that all hopes of disposing of the sludge for manurial purposes are entirely illusory. In concluding their report the committee trust that the recommendations they have made in reference to the disposal of deleterious gases will be carried out without unnecessary delay.

SMALL-POX HOSPITALS.

LAST week a deputation, illustrative of the good effects of vaccination and the dangers of erecting infectious hospitals in the midst of populations, had an interview with Mr. Sclater-Booth at Whitehall, Mr. Sait, Mr. Lambert, and Mr. Lumley, Q.C., being present. The Rev. R. T. Whittington stated that they represented the ratepayers of Onsett, who had deputed them to protest against the proposed conversion by the guardians of eighteen parishes around Onsett of the wards of the union into a small-pox hospital. Last June the Guardians of Grays sent into the women's ward of the Onsett Union a non-pauper case which spread to no less than seventy persons, many of whom died. Its ravages had been distinctly traced. It went from the infirmary to the healthy wards, thence over the village, the epidemic affecting a great number of people in a very short space of time. Notwithstanding the experience of the danger of an infectious hospital in close contiguity to the workhouse, yet the guardians had determined on erecting such an institution there, against the wishes of the whole population and their three guardians, whose votes were swamped by the representatives of the eighteen other parishes. Mr. I. F. Butler said that the infirmary into which the guardians admitted the case was only 18 feet from the women's wards, and persons passed it going in and out of the workhouse. They had traced the infection from the workhouse to the village, there being a south-west wind blowing at the time of the admission of the case, and within twenty-four hours they had no less than sixteen cases in the village. Mr. Butler remarked that it nearly ruined the village; for no one would go near it. Trade was stopped, and people were migrating as fast as they could. Despite the protests of the ratepayers, the guardians were going to erect a new building, at a cost of 1,000*l*., on the same spot, adjoining the union. Mr. George Biddell said the guardians would not sit at the board during the raging of the epidemic, the farmers would not let their carts go near the village, and the place was isolated. The epidemic subsided as rapidly as it broke out. Every person that could be was immediately vaccinated, and, singularly enough, the contagion was stamped out directly, or, rather, confined to the seventy who had contracted the disease. Mr. Sclater-Booth promised that their representations should be considered in conjunction with the proposals of the guardians. All they had stated would be made the subject of inquiry at the proper time, and care would be taken that the interests of the ratepayers should not be prejudiced in any way.

'SANITAS.'

ON the 6th inst. a number of gentlemen of distinguished position in science and sanitary matters assembled at the works of the 'Sanitas' Company, (the offices of which are at 57, Moorgate Street, E.C.,) to witness the process of manufacture and the scientific demonstration of the antiseptic and disinfectant characters of 'Sanitas.'

Mr. C. T. Kingzett, F.C.S., gave a history of his researches upon the hygienic influence of vegetation, and said this influence in the case of pine and eucalyptus forests was due to the turpentine principles secreted by these trees. The oil evaporates into the atmosphere, and there coming into contact with air and moisture undergoes oxidation and gives rise to the formation of peroxide of hydrogen (a substance nearly related to ozone) and certain camphoraceous products. In the manufacture of 'Sanitas' this process of nature's hygiene is exactly imitated. A current of air is forced through a number of vessels containing water and turpentine heated to the temperature of hot sunshine, and in this way the turpentine absorbs oxygen and gives rise to the products above characterised. These latter dissolve in the water and thus form a solution—known as 'Sanitas'—containing the health principles of pine forests. After explaining the whole process and showing the means adopted at the 'Sanitas' works for recovering the turpentine which is carried away in the state of vapour with the excess of air, Mr. Kingzett proved by a number of experiments, the facts that peroxide of hydrogen and substances are produced as described, and further that 'Sanitas' contains these principles. After this, specimens of meat, fish, and all sorts of decomposable matters were exhibited, which had been absolutely preserved for a long time by means of 'Sanitas,' and in other cases it was demonstrated that even matters in a state of putrescence had been restored to sweetness by the use of the same solution. It is non-poisonous, agreeable to use, and perfectly harmless to textile fabrics, metals and furniture, therefore 'Sanitas' fulfils all the conditions which can be required of a health-agent which may be used in every household and in every sick room.

PROFESSOR TYNDALL ON SPONTANEOUS GENERATION.

PROFESSOR TYNDALL gave a lecture on the 11th inst., at the London Institution, Finsbury Circus, on the subject of 'Certain Microscopic Organisms, their Genesis, and Work in the World.' The subject was treated with reference to the question of spontaneous generation. Professor Tyndall sketched the course of the dispute on the question, and then described his own experiments, and stated the conclusions to which they had led him. He filled a number of flasks with infusions of cucumbers, turnips, beef, and mutton, and hermetically sealed the tubes by drawing them out and closing them. He packed sixty of these flasks, and forwarded them to the Alps. Arrived there, he found six of the infusions muddy with bacterial life, and on examining the tubes he found them broken; the other tubes were intact, and the infusions were clear. In the case of the six flasks, was it not evident that the life found was due to the germinal matter that had entered with the influx of air? The next ques-

tion was—Could air itself produce a generative energy in the flasks? Four of the flasks got broken, and of the fifty remaining he opened twenty-three in a hay-loft by snapping the tubes at the end; he then carried the twenty-seven flasks 200 feet higher up the mountain, where he opened them in the face of a wind blowing over the higher crests, taking case to destroy by heat any germs which might be on his pliers, and standing so that the wind did not blow from himself towards the flasks. All the flasks were thus exposed to the air. They were taken to his house in the Alps, and were hung over the kitchen stove; at the end of three days twenty-one out of the twenty-three flasks opened in the hay-loft were crowded with infusorial life, while not one of the twenty-seven flasks opened in the mountain air showed signs of life. The latter set of flasks were still there, and he had no doubt they were as free from life as they were at the time of their departure from London; at all events, he saw them for three weeks, and they were without life. The conclusion was imperative that it was not the air, but something in the air, which must have produced the life observed, and that that something was fruitful particles or germs of life. If an infusion could be exposed to sterilised, moteless air, it would never putrefy, nor would meat so heated ever putrefy. But many would say that air sterilised by heat was not sufficient for life. This objection he had met by means of an apparatus in which the air purified itself, the air having been admitted into a box with glass panels, the inside of the frame being rubbed with glycerine; the particles in the air fell by gravitation and stuck to the glycerine, and in time a condensed beam showed that the air was optically pure. Atmospheric air was still admitted to the apparatus through tubes which arrested all particles of matter. For more than a year, upwards of fifty infusions had been exposed to the air in this apparatus, and they were as sweet and transparent as at the time they were introduced; while similar infusions exposed to ordinary air were in two days swarming with bacterial life. There was no doubt or uncertainty regarding these results. He was determined to recognise nothing which was not tested over and over again with undeviating accuracy, and he had experimented in every possible way during the last two years with nearly ten thousand flasks. Professor Tyndall next showed two tubes, one containing a saline or mineral solution, having all materials necessary for the building up of bacteria, the other containing an infusion of turnip. He would, he said, infect these solutions with the point of the finest sewing needle dipped into solutions alive with infusoria, and in twenty-four hours both solutions, which had been sterile for six months, showing no inherent spontaneous energy, would be filled with bacterial organisms. If they washed a little wisp of hay in a small quantity of water, so as to remove from the hay the almost impalpable dust with which it was covered, and then inoculated the two solutions with the water, in three days the turnip infusion would be crowded with bacteria, but the mineral solution would be perfectly unaffacted, even at the end of three weeks. It was as clear as day that the mineral infusion was capable of feeding the chick, but was not capable of hatching the egg. In the same way the floating matter in the air would produce bacteria in the turnip infusion, but not in the mineral solution. But a conclusion had been drawn in favour of spontaneous generation, that because the air produced no effect on the mineral solution, the turnip infusion did not get its bacteria from the air. The best literature of Germany was infected with this error. Such a conclusion was on the face of it logically unwarranted, and as a matter of fact was utterly unsound. Another erroneous inference, which was extending, was one drawn from the living bacteria, which were very sensitive to heat, and applied to the germinal matter of the air, which was hard and dessicated, and would germinate after eight hours' boiling. He overcame the resistance of the germs by killing them in the order of their resistance—that was to say, he heated an infusion from time to time as the germs developed, until there were no more germs left to grow. Then the infusion could be put on one side, and it was for ever afterwards barren.

Medical Officers' Reports.

LEEDS.—There were 12,134 births and 7,303 deaths during 1876, which gives a birth-rate of 41·6, and a death-rate of 25·0 per 1,000 in a population estimated at 291,580 persons. The birth-rate was 1·59 higher and the death-rate 2·5 per 1,000 lower than in 1875. The zymotic death-rate was 4·9 per 1,000 living, which was less than the average of the ten preceding years, the chief mortality from these diseases having been caused by scarlet fever and measles. There were 978 cases reported at the sanitary offices, of which it was ascertained that 731 were caused by infection, and as many as 161 from 'school infection;' and that there were 167 instances of bad drainage in the houses of the rich. There were 183 deaths from fever, the majority being typhoid, and 319 cases of fever, of which 172 were traced to infection, and 142 to bad drainage. The deaths from diarrhœa numbered 478, being equal to 1·6 per 1,000, which is less than usual, owing to the diminished heat of the summer, and of these deaths no less than 93·9 per cent. occurred amongst the children under five years. The infant mortality was very high, as 2,201 deaths of infants, equal to 30·1 per cent. of the total deaths happened amongst children under one year old. Dr. Goldie attributes this excessive mortality (18·0 per 100 born) to improper food, want of care and indulgence by the mothers in drink. We may remark here that by a singular inadvertence, the number of infantile deaths is stated to have been 3,201, while the tables show that the real number was 2,201, so that Dr. Goldie gives erroneous percentages in his report, which we have corrected. He also states his objections to the slaughter-houses and offensive trades in the borough, and gives a list of the latter, which extends over nearly seven pages; refers to the want of information as regards infectious diseases, to the absence of a public mortuary, and points out the injury to health resulting from the mode in which the town rubbish is disposed of, but hopes for better results when the large furnace for incinerating offensive materials is built. The sanitary work appears to have been actively carried out, as 13,061 houses were inspected, and the nuisances found thereon abated.

BOSTON, U.S.A.—The return for the week ending September 15 shows an annual death-rate of 26·7, of which more than one-third was caused by zymotic diseases, diarrhœa and typhoid fever being debited with the largest number. The deaths of children under one year old were about 37 per cent. of the whole number. The mean temperature for the week was 68° Fahr., the maximum having been 88° and the minimum 53°, without any rainfall. In London the annual death-rate for the same week was only 18·6 per 1,000 against the 26·7, and the mortality from diarrhœa only 6·8 per cent. of the whole. The mean temperature was 58·9° Fahr., the highest having been 73·4° and the lowest 49·1°, so that part of the excess in the diarrhœal deaths in Boston may fairly be attributed to the excess of temperature, but to a great extent they must have been produced by other causes. The mortality from diarrhœa in London, although large in hot summers, is smaller than in most great cities, which is to be attributed chiefly to the better paving, drainage, and scavenging which are to be met with here.

Law Reports.

CHIMNEYS ON FIRE.

NINETEEN persons have been summoned at the instance of Mr. Norman Bevan, on behalf of the Metropolitan

Board of Works, for having the chimneys of their houses on fire. Fines were inflicted, varying from 1*s.* to 10*s.*, with costs (2*s.*).

SWEEPING MUD DOWN A SEWER.

H. H. A. EVANS and J. Hudson were summoned by the Metropolitan Board of Works for sweeping mud down a sewer grating. Mr. Napier appeared for the Board of Works, and said the board were put to great expense by scavengers, whose duty it was to take away the mud, sweeping it down the sewer grating, and it was to check the practice that the present proceedings were taken. Mr. Mansfield fined Hudson, who was foreman and gave directions, 10*s.*, and 2*s.* costs, and each of the other defendants 5*s.*

OFFENCES AGAINST THE EXPLOSIVES ACT.

H. BROCK, firework manufacturer, Whitechapel, was summoned at the instance of the Board of Works for keeping explosives in an unauthorised place. It appeared from the evidence of an inspector to the board that at five o'clock on the evening of November 5, he visited the defendant's place, and saw a large covered van standing outside. It was completely enclosed, excepting the back part, which was open. In answer to questions by the inspector, the defendant admitted the van belonged to him, and contained fireworks. The inspector found twelve cases containing fireworks, three of them being open. The other cases had the lids on, but were not fastened. Mr. De Rutzen convicted the defendant for keeping fireworks in an unauthorised place, and fined him 61*l.*, being a shilling a pound for 1200 lbs.

WHAT IS A COMMON LODGING-HOUSE?

THE case of *Langdon* v. *Broadbent* has done something to settle this knotty point. This was a case in which an information had been laid before the magistrates at Brainton, in Devonshire, against the respondent, as the keeper of a common lodging-house within the meaning of the Public Health Act, for not registering the house under the Act. It was proved that the defendant kept a shop and lodging-house in High Street, Ilfracombe. He had received lodgers there, mostly hawkers and pedlars, at 6*d.* a night, and the police had frequently recommended the house to people of that class. The magistrates dismissed the summons, and stated the case to obtain the opinion of the Court, whether upon the evidence they were entitled to hold that the house was a common lodging-house within the Act. Mr. Justice Grove said the case must be sent back. There was ample evidence that the house was one that came within the spirit and meaning of the Act.

NUISANCE ON A COMMON.

AT Wandsworth, Mr. Bridge heard an adjourned summons, taken out by the Richmond sanitary authority, against the clerk of the Conservators of Barnes Common, in respect of a nuisance arising from the state of Barnes Green pond. The summons had been adjourned to give the conservators an opportunity of cleaning the pond. Mr. Wood said that more than a year ago complaint was made of the pond being a nuisance. A letter was ordered to be written to the conservators, giving them notice to clean out the pond before the wet weather set in. Up to the present time nothing had been done except to advertise for tenders for the work, and to call the ratepayers together. No tenders were received. The authority was most anxious that pressure should be brought to bear upon them. Mr. Clark said it was a great pity that they should be forced into hostility, as Mr. Wood was aware that the conservators had a difficulty to raise money. They were in a different position from the Conservators of Putney Common, who had a rate of their own, but the conservators of Barnes had no rate, nor any power of raising money. They had applied to the Vestry of Barnes, who had given 100*l.* for the work. He asked the magistrate to grant another adjournment, as the work was not pressing, and in weather like the present there would be a difficulty in cleaning the pond. If they pressed for an order, he should resist it, and call witnesses to prove that the pond was not a nuisance. Ultimately Mr. Clark conceded certain points, and the magistrate adjourned the summons for four months.

FRAUD BY AN INSPECTOR OF NUISANCES.

T. WEST, a furniture dealer at Walham Green, was re-examined on a charge of being concerned with the sanitary inspector of Fulham in obtaining various sums of money from the district board of works by false representations. A warrant had been granted for the apprehension of Keil, the sanitary inspector, but he had not been found. It appeared that during the outbreak of small-pox in the parish the inspector received instructions to destroy the infected bedding, and supply the sufferers with other articles. For that purpose he employed the prisoner to supply bedding, and the practice was to pay him after the items in the accounts had been initialed by the inspector. In the course of an investigation it was discovered, in many cases, that a charge had been made for articles which had not been supplied. The prisoner said he acted under the instructions of Keil, and that he meant to 'let out' about the inspector burning 'dummy' beds on the common and selling the beds themselves. Mr. Farman reserved the defence. The prisoner was committed for trial.

WATER COMPANIES AND THE PUBLIC.

THE Southwark and Vauxhall Water Company were summoned before Mr. Partridge, by Charlotte Snook, for refusing to supply her with water after tendering the rates due. The complainant said she had been a customer of the company for 20 years, and had been four years in her present abode. She unfortunately allowed the water-rate to be in arrears in the sum of 28*s.*; but because she was not able to pay that sum when last demanded, they cut the water off. She begged of the collector to call again before doing such a cruel act, but he took no heed of her appeal, and she had since been without water. Mr. Partridge asked her if she had paid the arrears due. Complainant replied that she had tendered the money, but the company refused to put the water on again unless she paid all expenses for cutting off and replacing the pipes, as well as a quarter in advance. She could not do that, and the consequence was that the water was stopped and their health endangered. Mr. Partridge strongly animadverted as to the conduct of the company in cutting off the water when they had the power to summon her to this court for the arrears. The complainant reminded his worship that small-pox and fever were on each side of her, and it was necessary that she should have a supply. If they had waited only two hours she would have been able to pay. Mr. Partridge observed that the company had their Act of Parliament to support their monopoly, and the provisions of the Act gave them the power to do as they had done. He, however, thought they had been a little to blame by cutting off the water where small-pox and fever were raging. The complainant seemed to be a poor and respectable woman, who had paid for so many years that he thought the company might restore her the supply on her payment of the arrears. The supervisor of the company, promised to lay his worship's recommendation before the directors, but reminded the magistrate that the company had not exceeded their power. Mr. Partridge was aware of that, and in dismissing the summons, he directed the cost of it to be returned to the complainant.

THE GAS-LIGHT AND COKE COMPANY.

MR. JUSTICE FRY has had before him the case of *Attorney-General* v. *The Gas-Light and Coke Company*. This was an information at the relation of the West Ham Local Board to restrain the gas company from carrying on business at their works at Canning Town so as to cause a public nuisance. The nuisance arose from the discharge

of sulphuretted hydrogen from gas lime during the process of moving it. The defendants did not deny the nuisance, but they raised a defence which amounted to a claim to a statutory power to commit the nuisance. They alleged that under their own Acts and the various Metropolitan Gas Acts, and the requisitions of the referees appointed under those Acts, they are bound to produce gas of a certain degree of purity with reference to sulphur compounds; that they are bound to eliminate from the gas they supply to the metropolis sulphur compounds to such an extent as to render it practically impossible for them to carry on their works without discharging the noxious gas complained of. Mr. Justice Fry said that the evidence established that for a great part of the period during which the nuisance was complained of a large part of the noxious vapour was due to the shovelling and disturbance of gas-lime which the defendants had taken to their Bromley works from their two other gasworks. Dr. Odling, one of the defendants' own witnesses, estimated the proportion at one-half; the defendants would have no statutory justification for this proceeding, and the plaintiff would be entitled to an injunction on this ground. His lordship, in construing the various Acts which had been referred to, gave his opinion that the liability of the company in respect of nuisance was expressly kept on foot. But, apart from that consideration, he thought the defendants had not shown that they had adopted all the means in their power to prevent the nuisance. The referees—officers appointed under the Gas Acts—had in the discharge of their duties fixed a standard of purity, such that, in their opinion, the gas companies, in the present state of gas engineering, could practically attain without the necessity of injuring anyone; and therefore they rested on the defendants the burden of showing that they had adopted the best means of preventing the nuisance. In his opinion they had failed to discharge that burden, and an injunction must be granted, not merely limited to the foreign lime from other works. Three months' grace was allowed.

ACCIDENT FROM STEAM-ROLLER.

MR. J. LOPES has had before him the case of *Maxwell* v. *Mowlem*. The plaintiff is a publisher in London, and the defendants are a firm of contractors for the repair of roads. The action was brought to recover compensation for the loss of a horse, and for injuries to the plaintiff's carriage caused by the negligence of the defendants' servants in managing a steam-roller. On October 26, 1876, the defendants were repairing the roadway opposite Prince's Gate. The plaintiff's brougham, containing his wife (better known as Miss Braddon) and children approached from the west. According to the evidence of the coachman, the man in charge of the roller suddenly set the engine in motion, caused the horses in the plaintiff's carriage to run away, throwing the coachman off the box, and knocking down a lamp-post. The off horse sustained such serious injuries that he had to be killed, and the carriage was also damaged, those inside, however, escaping without being seriously hurt. It was proved that the pair of horses cost 240*l.* two years before the accident, and that they were quiet in harness, and were ridden by the plaintiff's daughters. The off horse had an extra piece of leather on his blinkers on account of a trick he had of raising his head when he saw anything unusual above him, such as a van full of children waving flags, many of which are often seen at Richmond. Mr. Mellor relied on the provisions of the Act of Parliament regulating the use of locomotives in the streets; but the learned judge ruled that there was no hard-and-fast line laid down in the statutes applicable in this case. On behalf of the defendants it was attempted to be shown that the accident was due in part to the negligence of the coachman in disregarding a notice board warning drivers of carriages of the presence of the roller, and in part arose from the deficient vision of the plaintiff's off horse. The evidence was very contradictory as to the notice board, the plaintiff's witnesses alleging that the warning on it was turned towards the east, and the defendants' witnesses saying that they noticed that it was so placed that anyone approaching from the west could see it. The learned judge explained to the jury the law of negligence, and the jury found a verdict for the defendants.

[Mrs. Maxwell has written to the *Times* on this matter a very foolish letter, which shows how little the feminine mind can be relied upon for judicial purposes. Her argument is really this, that better have bad roads than use a roller which may frighten horses. If the road authorities were to take this talented lady at her word, she would be one of the first to make an outcry at the damage done to carriage springs by unrolled roads.]

THE SANITARY CARBON COMPANY.

THE Master of the Rolls has had before him the case of *The Sanitary Carbon Company* (*Limited*). This was a petition for the compulsory winding up of the company, and disclosed some amusing incidents, somewhat similar to those in a recent case of *Sharp* v. *Dawes*, where it was decided that a 'meeting' could not be held by one person. The petitioners were the former solicitors of the company; they had obtained a judgment against the company for a sum of 88*l.* 7*s.* 10*d.* and costs, and had issued an execution in respect thereof, which was unsatisfied. On September 10, 1877, an extraordinary resolution to wind up the company voluntarily had been passed, and the liquidator appointed, and the company submitted that a compulsory winding up was altogether unnecessary, and would only waste the small amount of assets of the company in useless costs. The petitioners, on the other hand, contended that the extraordinary resolution was wholly void, as it was passed by only one person, who had the proxies of three other persons in his pocket, and that they were entitled, as of right, to their winding-up order. There never were more than seven shareholders in the company at all, and these, in September, were reduced to four, and this fact was alleged as another ground for a winding-up order. The company was in part governed by the Articles contained in Table B to the Companies Act, 1862. By Article 12, 'No business can be transacted at any meeting unless a quorum is present. If the members do not exceed ten, the quorum is five.' By Article 22 votes may be given personally or by proxy. The Master of the Rolls said that after the company had called an extraordinary meeting, this extraordinary proceeding had occurred. One gentleman only was present at this 'meeting,' and had voted himself into the chair. Being in the chair he had proposed the voluntary winding up in the name of one of the gentlemen whose proxies he held; had seconded it himself, and had carried it himself. He thereupon declared that the company, being unable to meet its liabilities, ought to be wound up, and he proceeded to appoint a gentleman the liquidator. It had been gravely argued that this was a 'meeting' of the company; and even if no case had been cited to him where such a proceeding had been held invalid, he should have been prepared to make a precedent himself. The case of '*Sharp* v. *Dawes*' was however a distinct authority to the contrary, and apparently the only difference between that case and the present was that in the former case the gentleman had actually passed a vote of thanks to himself as chairman. Independently of the above, it was clear that no 'quorum' of the company had been present, according to Article 12 of Table B, and the meeting was invalid on that ground also. No extraordinary resolution had been passed, and therefore there was no voluntary winding-up and no liquidator.

OBSTRUCTION OF A FOOTWAY.

AT the Tonbridge Petty Sessions, J. G. Talbot, Esq., M.P., in the chair, Z. Sandall, butcher, was charged with 'hanging up or otherwise exposing to sale carcases of meat, so that the same projected into the footway or beyond the line of the house or building at which the same were

exposed, so as to obstruct or incommode the passage of any person over or along such footway, to the obstruction, annoyance, or damage of the residents and passengers within the district of the Tonbridge Local Board, at Tonbridge, on November 8.' Mr. Warner said the Tonbridge Local Board had considered it their duty, as a public body, to take these proceedings for the convenience of the general public. Soon after the formation of the board certain by-laws were prepared, and amongst them was one which read thus: 'Every person who places, hangs up, or otherwise exposes to sale any goods, wares, merchandise, matter, or thing whatsoever, so that the same projects into or over any footway or beyond the line of any house, shop, or building, at which the same are so exposed, so as to obstruct or incommode the passage of any person over or along such footway, shall be liable upon conviction, to a penalty not exceeding 40*s.*, or, if the justices shall see fit, to imprisonment for a term not exceeding seven days.' He then submitted to the notice of the bench two cases in which persons had been convicted for obstruction of footways; and stated that the board did not wish for a heavy fine to be imposed, but desired an assertion of their power by a conviction. Mr. Hobbs, surveyor to the board, called upon Sandall and left him a copy of the by-laws. He also visited thirty-five other tradesmen on the same day. It was about mid-day on October 9 when he called at Mr. Sandall's, and four quarters of meat were hanging outside his shop, one of which projected 13½ inches beyond the shop. Mr. Palmer addressed the bench for the defence, and expressed his regret at the manner in which the Local Board had commenced to trouble the tradesmen. He said he considered that if hanging the meat outside was a nuisance the board had been a very long time in finding it out. He was not going to say that the long continuance of an obstruction made it no obstruction at all. As to the annoyance that had been complained of, he treated the idea with contempt, for a teetotaller might be annoyed at the sight of a public-house sign, or bottles of gin in a window, but according to law that was no annoyance. He knew this meat might annoy a vegetarian. Mr. Sandall had kept this shop thirty-five years, and only a year or two ago had given six inches to the path by removing a wooden slab and placing the present marble one further in; and no one had now dared to come forward and say that the meat had been a nuisance to them, except the surveyor, who had himself been incommoded. The bench thought an obstruction had been proved, and that it was not necessary to prove that any particular person had been incommoded; and defendant was therefore fined 2*s.* 6*d.* and costs.

A similar summons served upon another butcher, was withdrawn.

TITLE TO LAND FOR NEW STREETS.

THE Court of Appeal, on November 13, had before it the case of *Mackett* v. *Herne Bay Commissioners*. In this case their Lordships affirmed in effect the judgment of Vice-Chancellor Bacon, so far as related to the construction of the Act of 1833, under which the defendants, in alleged exercise of their statutory powers, had in 1868 caused lands in the possession and cultivation of the plaintiffs or their tenants for agricultural purposes, to be 'gripped up' and stumped out for the purpose of marking out the streets and squares according to the plan deposited in Parliament when the Act of 1833 was introduced. Their lordships were of opinion that the powers of the Commissioners could not be exercised over land scheduled in their Act, and marked out as the site of intended roads and streets until the roads had been made and laid out and duly adopted by the Commissioners. But upon the further question whether the plaintiffs had sufficiently established their title to the lands over which the Commissioners had exercised acts of ownership, their lordships directed the case to proceed upon the evidence. Lord Justice James was of opinion that the defendants had failed upon the substantial part of the case, both in establishing their construction of the Act of Parliament of 1833, under which they were constituted, and also in their contention upon the evidence that they had taken possession adversely to the plaintiffs of the sites of the proposed streets and roads, and that the plaintiffs' possession or occupation was so derived from the adverse possession of the defendants, that they were estopped from disputing the title of the defendants. But the plaintiffs at the same time had, with respect to certain roads, failed to show acts of possession. He was of opinion, however, that this ought not to make any difference in the costs of the litigation. It would be very difficult to apportion the costs in consequence of the failure of the plaintiffs on this part of the case, and he was very loath to put the parties to the expense of sending them to a new litigation before the taxing master. It must be remembered, too, that it was very hard on the plaintiffs to be dragged into this litigation by the Commissioners, who had actually been taxing them as ratepayers to contribute to the expenses. The plaintiffs would have the costs of the suit, with the exception of so much as had been occasioned by one of the affidavits. The decree would be varied by adding the words 'without prejudice to any question as to any right of the Commissioners to any road which shall be hereafter duly made and laid out and duly adopted by the Commissioners;' and the injunction would be limited by omitting from its operation certain streets. Lord Justice Thesiger also concurred, being of opinion that the plaintiffs had sufficiently established, by themselves or by their tenants, a possession of the lands in question, with the exceptions already indicated. It might be that the plaintiffs' possession was restricted by rights of way. On that he gave no opinion, but it was clear that neither Brough (through whom the plaintiffs claim), nor his representatives were mere licensees of the Commissioners. On the contrary, being in possession they had allowed the Commissioners to enter for the purpose of marking out the sites of the proposed roads. His Lordship had felt some difficulty upon the question of costs, but he thought that in the main the Commissioners had been in fault. Having regard to the frame of the bill, which prayed a declaration that the defendants were not authorised to exercise acts of ownership over the particular lands, the defendants might have given the go-by to the question of title and contested the case upon the construction of the Act only. As the plaintiffs had succeeded in the main issue, they ought to have the costs with the exception mentioned.

Legal Notes and Queries.

MAD DOGS.

THE following order has been issued at all the Metropolitan Police Stations: 'Whereas, dogs suspected of being mad having been recently found within the Metropolitan Police District, I, Edmund Yeamans Walcott Henderson, the Commissioner of Police of the Metropolis, pursuant to the Dogs Act, 1871, and in exercise of the powers vested in me as the local authority under the said Act for the Metropolitan Police District, do hereby order that no dogs, not being under the control of any person, shall be henceforth, for the period of 60 days, suffered to be in or upon any thoroughfare or public place, or any place open to the public, within any part of the Metropolitan Police District, except within such parishes and places as are now within the jurisdiction of the Metropolitan Board of Works, and to which the provisions of the Metropolitan Streets Act, 1867, already apply and are in force.' An addendum to the order states that all dogs not being under control will be seized by the police and disposed of in accordance with the law.'

HOSPITAL ACCOMMODATION.

UNDER sec. 131 of the Public Health Act, 1875, any local authority may provide, for the use of the inhabitants of their district, hospitals or temporary places for the re-

ception of the sick. The rural sanitary authority for the district of A. has received several communications from the Local Government Board, requesting to know what steps are being taken by the authority under the above section: and, after much consideration, the authority have decided not to build any hospital or provide any other temporary place for the reception of persons suffering from infectious diseases. Can the Local Government Board compel the rural sanitary authority to provide any hospital or other accommodation? If so, what proceedings would they take against the authority? A. B.

[It is optional with a local authority to provide hospital accommodation; and if it will not do so, the Local Government Board cannot compel it to do so. The powers of compulsion vested in the Local Government Board by sec. 299 of the Public Health Act do not include hospitals.—ED.]

BUILDING BY-LAWS.

THE following by-law has very recently been made and allowed for the borough of S., viz.: 'Every person erecting a new building to be used as a dwelling-house shall provide in the rear or at the side thereof an open space exclusively belonging thereto, to the extent of at least 150 square feet, free from any erection thereon above the level of the ground. And he shall cause the distance across such open space between every such building and the opposite property at the rear or side to be fifteen feet at least.' Plans submitted for the approval of the council for building ten houses upon a plot of ground of an irregular shape shows 1,500 square feet clear of any erection as collectively appropriated to the ten houses; but in consequence of the houses proposed to be built being upon three sides of the ground, and the two opposite sides not being parallel to each other, the three houses at the narrow end have not 150 square feet exclusively appropriated to each. The distance across from the rear of one house to the rear of the other exceeds fifteen feet, but is under thirty feet. The question now arises whether the space and distance across is sufficient under the above by-law. It is contended that the 150 square feet and 15 feet across must be exclusively appropriated to each house, and a boundary marked on the plan between each row, thus practically making the distance between the houses thirty feet at least. TOWN CLERK.

[The contention in this last sentence of this letter is clearly the correct one. Each house must have its own 150 feet, and its own 15 feet of depth.—ED.]

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

LLOYD'S PATENT IMPROVED VENTILATOR.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Referring to your valuable article on the 'Lloyd Patent Improved Ventilator,' in your last issue, I can fully corroborate the remarks therein. The cowl, as shown, is a simple and effective apparatus. I am, however, astonished to see that a British patent has been granted to Mr. Lloyd for this cowl. I myself know that the cowl was brought to this country from Amsterdam, in October 1874, that it was also publicly referred to by a medical officer of health in the *Northampton Herald*, August 7, 1875, and that it was used extensively since that date on the top of soil-pipes by Mr. Rogers Field, C.E., and that it was also used at Uppingham, in January 1876, by Mr. M. O. Tarbotton, engineer to the Uppingham school authorities.

The above dates will, I think, show that the cowl was largely in use prior to Mr. Lloyd's patent, which is dated August 23, 1876.

While writing, I may as well say in reference to Mr. Buchanan's letter, in your issue of November 16 ult., that considering that he is of opinion that the 'small pipe' of an inch or two diameter is equally as good as the full open grating over the trap, and that he talks of putting the trap inside the house, his opinions as to what constitutes a proper open air 'disconnection' differs so much from mine that I can see no advantage in discussing the matter further with him. J. WALLACE PEGGS,

4, Queen Anne's Gate, Westminster,
December 10, 1877.

Sanitary Inventions.

VERITY BROTHERS' PATENT VENTILATOR OR AIR PROPELLOR.

THE inventors have to be congratulated upon the successful working out of an entirely novel idea, and that in a branch of sanitary engineering where, considering the large number of appliances already in use for effecting the same object, there seemed scarcely room for an apparatus different from all yet superior to many. As all practical men know, ventilating apparatus may be roughly divided into two distinct classes—one with moving parts, the other without. Some of the former are, when used on the largest scale, put in motion by steam; in other cases depending on the movement of the air for their efficiency, the latter depending entirely upon the same power. We may justly recommend to the favourable notice of our readers this invention which is absolutely certain in action at all times; and whether required for the introduction of cooled air in summer, or the extraction of heated air in winter, is still equally effective and perfectly under control under all circumstances. In many ventilators there is not by any means a remote chance of their effect being least when it is most required—in the heat of the summer—a time when a gentle stream of gratefully fresh and cool air is most necessary. The apparatus under notice removes such an objection. It is driven by a power always at command, inexpensive, and under the most perfect control, and not demanding technical knowledge of the most simple description on the part of the attendant—we refer to water—the moving power employed. Verity's Ventilator somewhat resembles in appearance an ordinary gas-meter, and occupies about the same space. It may be fitted by any plumber at an insignificant cost. A cistern placed in the highest available position in the building in which the apparatus is to be used, and a quarter inch-leaden gas pipe conveying the water, are the sole additions to the first cost of the machine. The internal mechanism consists of a drum with a set of fans worked by a fly-wheel placed in the centre and on the same axis as the fans. The jet of water from the cistern and conducted by the tube, puts these fans in rapid motion. A current of air equal to 2,500 cubic feet per minute may be passed through the machine when working at full power; reducing the supply of water by turning the tap, the revolutions may be brought down to three or four per minute, it will thus be seen that the current of air may be regulated to the nicest degree. By raising a nut connected with a valve the action reversed, and the apparatus, instead of pumping in the external air, then performs the office of an efficient extractor of vitiated air. This double action renders the apparatus of twofold value. A couple of them placed in proper position and nicely regulated, secure the result of an incoming current warmed or cooled, as desired; of the exact force required and no more, and an extracting power equal to or greater than the inlet supply. The water after working the machine passes down through minute orifices, thus effectually washing incoming air. A chamber is provided for ice to cool the air in summer, and a box is also added for the introduction of

disinfectants or medicinal substances. The thorough and efficient manner in which every detail of this most useful, efficient, and economical contrivance has been worked out reflects the greatest credit upon the inventor. It places within the reach of physicians and surgeons a means of supplying to their patients the particular kind of air, whether warm, hot, cold, or medicated, as may be best suited to their maladies, and affords to officials interested in the ventilation of public buildings a means of securing the best results in the ventilation of large areas. It may be applied to the ventilation of sewers, to drawing off noxious fumes arising from many processes of manufacture, to the ventilation of apartments or houses. In fact, the invention provides for every difficulty which can possibly arise in the search for pure air under the most difficult conditions.

The apparatus described may be obtained for ten guineas of Messrs. Verity Bros., 127, Regent Street, London, W., the inventors and manufacturers.

MARSHALL AND SNELGROVE'S RESPIRATOR VEIL.

LADIES and children frequently require a respirator, but many persons who should wear such a safeguard against the dangerous and sudden changes of our variable climate have not the moral courage to disfigure themselves with the hideous black patches over mouth and nose, called respirators. The respirator veil differs but little in appearance from an ordinary veil, and cannot be called unsightly by the most fastidious. It is made of plain net, the lower border from side to side and to the depth of three or four inches, is first thickened by a double fold of silk gossamer; the part hanging before the mouth and nose is made stiffer and slightly thicker by the insertion of some very fine and delicate wire gauze. The effect of a respirator is thus gained without its unsightliness, and, with the additional advantage of keeping the ears and face warm, which ordinary respirators fail to do. Not only in winter are these veils useful, but they afford a protection against dust during the blustering winds of early spring. Messrs. Marshall and Snelgrove, of Oxford Street, are the manufacturers and vendors.

Notice of Meeting.

THE INSTITUTION OF CIVIL ENGINEERS.

AT the meeting on Tuesday, December 4, 1877, Mr. G. R. Stephenson, President, in the Chair, it was announced that the Council, acting under the provisions of the by-laws, had transferred Messrs. John Henry Abbey, Huddersfield, Thomas Aveling, Rochester; Robert Ballard, Rockhampton, Queensland; John Barker, Westminster; Henry Bessemer, Denmark Hill; Thomas Cargill, Westminster; Jabez Church, Westminster; John Donaldson, Chiswick; James Henderson, Truro; John William Inglis, P.D.W., India; Henry Joll, P.D.W., India; Charles Ferdinand de Kierzkowski, Kollingham Road; George Kilgour, Great Winchester Street; James Henry Lynde, Manchester; Edwin Muir, Rochdale; Robert Carstairs Reid, Edinburgh; Arthur Lewis Stride, Fenchurch Street Terminus; John Isaac Thornycroft, Chiswick; and John Evelyn Williams, Boston, from the Class of Associates to that of Members.

THE Paddington Vestry have determined to take entire charge of the watering and slopping of their parish, and are about purchasing, on favourable terms, the entire plant of horses, carts, barges, and interest of a large wharf, from Mr. Mead, a contractor, retiring from business.

ERRATUM.

REIGATE.—Dr. Jacob wishes us to state that our critique of his report on this district should have been headed 'Reigate Rural Sanitary District,' and expresses his desire that particular places in the district should be mentioned. We have, therefore, to state that the small-pox occurred at Barstow; the outbreak of typhoid originated at Mersthan Rectory; and the indifferent water-supply was at Charlwood village. Also that the average death-rate was based on three years' returns.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

BROWN, Mr. William, has been appointed Inspector of Nuisances for the Ware Rural Sanitary District, vice Dye, deceased.

CLINCH, Mr. James, has been appointed 'Inspector of Nuisances for the Canterbury Urban Sanitary District, vice Vincent, deceased.

DAVIES, Thomas, has been re-appointed Inspector of Nuisances for the New Quay Urban Sanitary District, Cardiganshire.

ELLIS, Samuel R., has been appointed Clerk to the Portsea Island Guardians and Rural Sanitary Authority, vice Wills, resigned.

EVANS, Thomas, M.D., Univ. Edin., L.R.C.S. Edin., and L.M., has been re-appointed Medical Officer of Health for the New Quay Urban Sanitary District, Cardiganshire.

EWART, John, M.R.C.S. Eng., has been appointed Medical Officer of Health for the Accrington Urban Sanitary District, vice Booth, whose appointment has expired.

FLINN, John James, L.R.C.P. Edin., M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the Wem Rural Sanitary District, vice Gill, resigned, at 80*l.* for one year.

HODGKINS, Mr. Thomas, has been appointed Inspector of Nuisances for the Accrington Urban Sanitary District, vice Roskell, resigned.

KENWARD, Mr. Edwin, has been elected a Member of the Uckfield Local Board and Urban Sanitary Authority, vice Sinden, resigned.

LEIGH, James, Esq., has been appointed Treasurer to the Saltley Local Board and Urban Sanitary Authority, Warwickshire, vice Walker, resigned.

MARTIN, Mr. Alexander, has been appointed Surveyor and Inspector of Nuisances to the Sidmouth Local Board and Urban Sanitary Authority, vice Spear, resigned, at 40*l.* and 20*l.* per ann.

SPEAR, Mr. Christopher, has been appointed Collector to the Sidmouth Local Board and Urban Sanitary Authority, at 20*l.* per ann.

STEVENSON, Mr. has been re-appointed Inspector of Nuisances for a further period of five years to the Madley Rural and the Broseley, Dawley, and Much Wenlock Urban Sanitary Authorities, at 150*l.* per ann.

VACANCIES.

BINGLEY IMPROVEMENT COMMISSIONERS AND URBAN SANITARY AUTHORITY, Yorkshire. Surveyor. Application, stating Salary required, 14th instant, to J. N. Thacker, Clerk.

CHORLEY URBAN SANITARY DISTRICT, Cheshire. Medical Officer of Health.

LEEDS. Town Clerk, Clerk to the Urban Sanitary Authority, and Solicitor to the Corporation: 1,000*l.* per ann. Application, 20th instant, to Capel A. Curwood, Town Clerk.

LIVERPOOL URBAN SANITARY DISTRICT. Medical Officer of Health.

PONTYPOOL RURAL SANITARY DISTRICT, Monmouthshire. Medical Officer of Health for the No. 1 Sub-District.

ST. AUSTELL GUARDIANS AND RURAL SANITARY AUTHORITY. Cornwell. Clerk.

THETFORD, CORPORATION OF, AND URBAN SANITARY AUTHORITY, Norfolk. Collector and Inspector of Nuisances. Application, stating Salary required, 5th January, to John Houchen, Town Clerk.

NOTICE.

THE SANITARY RECORD *is published every Friday morning, and may be ordered direct from the Publishers. Annual Subscription, 17s. 4d.; free by post, 19s. 6d.*

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Original Papers.

ON THE WATER-SUPPLY OF SEASIDE WATERING-PLACES.

BY G. W. WIGNER, F.C.S.

(*Continued from p.* 360.)

SEATON, which is rather smaller than Sidmouth, has a mixed supply. A considerable number of the inhabitants are supplied by water derived from springs in the chalk hills, said to be some three miles inland, while the remainder are dependent on private wells. My assistant drew a sample of the public supply, from a main tap, on October 5, and it gave the following results :

	Grains per gallon.
Total solid matter	26·70
Loss on ignition after deducting combined carbonic acid	0·51
Lead and copper—none.	
Iron—slight trace.	
Chlorine calculated as chloride of sodium	3·27
Hardness before boiling, 17·0° (Clark's scale)	
,, after boiling, 5·2° ,, ,,	
Nitrogen as ammonia	0·0026
,, albuminoid ammonia	0·0028
,, nitrates	0·2060
,, nitrites	0·0040
Total nitrogen in these four forms	0·2154
Oxygen absorbed by organic matter	trace

The colour, smell, and taste of this water were satisfactory, and it was free from suspended matter. The microscope showed a few living organisms, but no other objectionable features. Three weeks later I had another sample of the same supply which was forwarded to me by an official, but the results were so closely concordant that it is scarcely necessary to print them. As far as this supply is concerned therefore, Seaton is well served. I had two samples taken from private wells. The first, which was marked G. H., gave the following results :

	Grains per gallon.
Total solid matter	46·42
Loss on ignition after deducting combined carbonic acid	0·15
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	16·97
Hardness before boiling, 17·2° (Clark's scale)	
,, after boiling, 8·0° ,, ,,	
Nitrogen as ammonia	0·0019
,, albuminoid ammonia	0·0049
,, nitrates	1·5350
,, nitrites	0·0050
Total nitrogen in these four forms	1·5468
Oxygen absorbed by organic matter	0·0680

This water had a pale yellowish colour, but was free from taste and smell. The albuminoid ammonia is on the line of second class waters ; the nitrogen as nitrates is excessive, and so also is the salt. The microscopical results were satisfactory. The water cannot, however, be considered a good one.

The other sample from a private well, was drawn on the same date, and was marked P. A. The results were as follows :

	Grains per gallon.
Total solid matter	76·20
Loss on ignition after deducting combined carbonic acid	14·98
Lead and copper—none.	
Iron—slight trace.	
Chlorine calculated as chloride of sodium	17·61
Hardness before boiling, 23·0° (Clark's scale)	
,, after boiling, 13·4° ,, ,,	
Nitrogen as ammonia	0·0030
,, albuminoid ammonia	0·0078
,, nitrates	2·1370
,, nitrites	0·0050
Total nitrogen in these four forms	2·1528
Oxygen absorbed by organic matter	0·0120

In this case the residue left on evaporation was quite deliquescent, and the taste of salt and nitrates distinct. The microscopical appearance was very unsatisfactory, and it will be noticed that the loss on ignition is excessive. This water must be classed as an absolutely bad one.

WEYMOUTH is a much larger place than any of those I have last referred to. I have had two samples from there ; one was drawn by my assistant from a main tap, on October 5, and the other was forwarded to me by the surveyor, on Nov. 24. The results were as follows :

	My Sample. Grains per gallon.	Surveyor's Sample. Grains per gallon.
Total solid matter	23·72	20·90
Loss on ignition after deducting combined carbonic acid	1·47	1·31
Lead and copper—none.		
Iron—slight traces.		
Chlorine calculated as chloride of sodium	3·28	3·04
Hardness before boiling, My sample, 13·1° ; Surveyor's sample, 12·5° (Clark's scale)		
Hardness after boiling, My sample, 3·8° ; Surveyor's sample, 3·2° (Clark's scale)		
Nitrogen as ammonia	0·0012	0·0066
,, albuminoid ammonia	0·0024	0·0041
,, nitrates	0·2660	0·2740
,, nitrites	0·0140	0·0060
Total nitrogen in these four forms	0·2836	0·2907
Oxygen absorbed by organic matter	trace	0·0300

Both samples of the water had a satisfactory colour, smell, and taste, and the microscopical results were in both cases as good as could be wished. This is a first class water.

LYMINGTON, with a population of about 5,000, is another of those unfortunate towns which are dependent on private wells only. On Sept. 14, my assistant obtained a sample which he pumped from a well at an hotel there, and it gave the following results :

	Grains per gallon.
Total solid matter	63·10
Loss on ignition after deducting combined carbonic acid	12·01
Lead and copper—none.	
Iron—very slight trace.	
Chlorine, calculated as chloride of sodium	16·38
Hardness before boiling, 19·7° (Clark's scale)	
,, after boiling, 12·0° ,, ,,	
Nitrogen as ammonia	0·0066
,, albuminoid ammonia	0·0054
,, nitrates	1·3300
,, nitrites	traces
Total nitrogen in these four forms	1·3420
Oxygen absorbed by organic matter	0·0760

This water had a yellow colour and a very

offensive smell and taste. It was saline, the albuminoid ammonia is ·0054, and the nitrates are excessive; the loss on ignition is 12 grains per gallon. As to the microscopical results, it would not be easy to find a stagnant pond which presented a greater variety of specimens of living animalculæ. This water is totally unfit for human use, and yet at Lymington it is considered a good (!) water.

On Oct. 17, a correspondent at Lymington forwarded me another sample from a well which had recently been repaired and presumably cleaned out. The following are the results:

	Grains per gallon.
Total solid matter	16·50
Loss on ignition after deducting combined carbonic acid	2·83
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	4·10
Hardness before boiling, 8·3° (Clark's scale)	
,, after boiling, 6·1° ,, ,,	
Nitrogen as ammonia	0·0035
,, albuminoid ammonia	0·0028
,, nitrates	0·2210
,, nitrites	0·0030
Total nitrogen in these four forms	0·2303
Oxygen absorbed by organic matter	0·0260

The microscopical examination of this sample proved perfectly satisfactory. The colour, smell, and taste of the sample were also all good. Thus this well is at present—or rather I should say on Oct. 17 it was—a satisfactory source of supply. How long it is likely to remain so may be judged from the information I obtained from a resident in the town: 'Some houses have dust holes into which all slops, etc., are emptied, which consequently affects the well of the next house, which is somewhat lower.' Such a statement makes it easy to understand why the well just cleaned out is a good source of supply, and the one which has been in use some time yields sewage. It is much to be regretted that the authorities did not think fit to send an official reply to my request for information, for such a state of things as is described to me is a disgrace to an English town.

GOSPORT is part of the Alverstoke Local Board District, which includes some of the rural suburbs of Gosport as well as the town itself. The population is about 22,000, and the town is supplied with water by the Gosport Waterworks Company, who obtain their supply from an artesian well 320 feet deep, and pump about 300,000 gallons per day. My report states that many of the inhabitants are not supplied by the company. The supply is continuous during the day, *i.e.* from 6 A.M. to 10 P.M., but is shut off during the night. The water is not filtered. It is reported to have been recently analysed with satisfactory results, but I have not received the figures of the analysis. I have had two samples, one drawn on September 19 from the service-tap at the offices of the company, and forwarded to me by Mr. Compigne, the clerk to the company, and the other sample drawn by my assistant from a main tap on September 15. The following are the results:

	From Mains. Grains per gallon.	Mr. Compigne. Grains per gallon.
Total solid matter	28·00	26·20
Loss on ignition after deducting combined carbonic acid	3·42	2·94
Lead and copper—none.		
Iron	very minute trace	slight trace
Chlorine calculated as chloride of sodium	6·87	7·20
Hardness before boiling, from Mains, 8·3°; Mr. Compigne, 10·5° (Clark's scale)		
Hardness after boiling, from Mains, 2·9°; Mr. Compigne, 3·1° (Clark's scale)		
Nitrogen as ammonia	0·0030	0·0011
,, albuminoid ammonia	0·0015	0·0019
,, nitrates	0·0280	0·0380
,, nitrites	trace	0·0040
Total nitrogen in these four forms	0·0325	0·0450
Oxygen absorbed by organic matter	0·0320	0·0360

In both cases the colour of the water was a very good pale blue, there was no suspended matter, and the smell and taste were both good, and the microscopical results were also satisfactory. This water is softer than that of Portsmouth, and contains less combined nitrogen, but on the other hand it is more saline and contains more total solid matter. It is a good water.

PORTSMOUTH has a population of about 125,000, but comparatively few visitors. It is supplied by a company who obtain their water from springs at the outcrop of the chalk; the supply is partly intermittent and partly constant, and where intermittent the supply lasts from four to six hours per day. The water is not filtered, and is only available in case of fire by fetching the turncock, but the company report that as soon as the arrangements for a constant supply which they are endeavouring to complete as quickly as possible are finished, the water will be always available. About half a million gallons per day are supplied to the dockyard, and including this the supply averages 30 gallons per head per day. I have had two samples, one drawn by the borough engineer on July 26 from a tap on the constant service system, and another drawn from a main tap by my assistant on September 15, or more than seven weeks later. The results were as follows:

	From Engineer. Grains per gallon.	From Main. Grains per gallon.
Total solid matter	20·00	22·03
Loss on ignition after deducting combined carbonic acid	1·90	0·18
Lead and copper—none.		
Iron	traces	slight trace
Chlorine calculated as chloride of sodium	2·22	2·11
Hardness before boiling, from Engineer, 13·2°; from Main, 14·2° (Clark's scale)		
Hardness after boiling, from Engineer, 3·0°; from Main, 2·8° (Clark's scale)		
Nitrogen as ammonia	0·0037	0·0007
,, albuminoid ammonia	0·0025	0·0012
,, nitrates	0·2310	0·0560
,, nitrites	traces	traces
Total nitrogen in these four forms	0·2372	0·0579
Oxygen absorbed by organic matter	0·0180	0·0360

Considering the interval which elapsed between the dates at which the two samples were drawn, the results are fairly concordant. The latter sample, viz., that drawn by my assistant, is, however, the better of the two. The engineer's sample had a cloudy greenish-blue colour, and traces of suspended matter, consisting chiefly of deposited chalk. My

own sample was free from suspended matter, and had a good pale blue colour. The smell and taste of both samples were good, and the microscopical results were quite satisfactory. It will be seen that in my sample the albuminoid ammonia and nitrogen in other forms are very low, and taking all the figures into consideration the only fault which can be found with the water is that it is too hard. I received another sample from this town some months previous'y, and in its general characteristics the analysis of that also corresponds very closely to the two above referred to.

I have now made the complete circuit of the coast, and before crossing over to the Isle of Wight I will take the opportunity to refer to some small places which have been omitted.

HORNSEA, in Yorkshire, has a population of about 2,000. Arrangements are now being made for a public supply, which it is expected will be a constant one. At present the inhabitants are dependent entirely upon the public pumps and springs. I have been favoured by Messrs. Loten Brothers with a sample drawn from a public pump, which gave the following results :

	Grains per gallon.
Total solid matter	84·60
Loss on ignition after deducting combined carbonic acid	10·00
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	15·91
Hardness before boiling, 32·0° (Clark's scale)	
,, after boiling, 12·0° ,, ,,	
Nitrogen as ammonia	0·0030
,, albuminoid ammonia	0·0099
,, nitrates	1·8200
,, nitrites	traces
Total nitrogen in these four forms	1·8329
Oxygen absorbed by organic matter	0·0060

When warmed the sample had a distinctly offensive taste, but was free from smell. The dried residue was quite deliquescent, and under the microscope it showed much vegetable contamination. The loss on ignition and the amount of nitrogen as nitrates are both excessively high. The Hornsea authorities are not proceeding any too soon with their waterworks, for this sample of their pump water is not fit to drink.

GREAT CROSBY is said to have a constant supply from the Liverpool waterworks. A sample has been forwarded to me by Mr. W. H. Forster, and it gave the following results :

	Grains per gallon.
Total solid matter	27·00
Loss on ignition after deducting combined carbonic acid	5·48
Lead and copper—none.	
Iron—traces.	
Chlorine calculated as chloride of sodium	4·21
Hardness before boiling, 8·6° (Clark's scale)	
,, after boiling, 7·2° ,, ,,	
Nitrogen as ammonia	0·0026
,, albuminoid ammonia	0·0055
,, nitrates	0·2480
,, nitrites	0·0040
Total nitrogen in these four forms	0·2601
Oxygen absorbed by organic matter	0·0080

The colour and taste of this water were both good, but there was a very slight offensive smell. The results of the microscopical examination were quite satisfactory. The albuminoid ammonia viewed alone is high enough to rank the water as second class, and looking at all the results, it must be so considered.

LLANFAIRFECHAN is a small place in North Wales, and is supplied, partly by a water company, and partly by a private supply. The company's supply is derived from little springs and rivulets of water on the hill-sides. The private supply is from a river which flows down the valley in which the village is situated, but the river is tapped above the village. The two supplies are so similar in character that I print them side by side :

	Private Supply. Grains per gallon.	Company's Water. Grains per gallon.
Total solid matter	4·60	4·40
Loss on ignition after deducting combined carbonic acid	0·90	1·40
Lead and copper—none.		
Iron	traces	slight trace
Chlorine calculated as chloride of sodium	1·29	1·41
Hardness before boiling, Private Supply, 1·4° ; Company's Water, 1·5° (Clark's scale)		
Hardness after boiling, Private Supply, 1·4° ; Company's Water, 1·5° (Clark's scale)		
Nitrogen as ammonia	0·0012	0·0015
,, albuminoid ammonia	0·0028	0·0028
,, nitrates	0·0240	0·0280
,, nitrites	0·0040	traces
Total nitrogen in these four forms	0·0320	0·0323
Oxygen absorbed by organic matter	0·0780	0·0400

In both cases there was a yellow tint in the water, that of the private supply being the strongest, and the oxygen absorbed accords with this result. The combined nitrogen was very low ; the microscopical results were in both cases quite satisfactory, and the waters were very soft. They are both very good waters.

SANDGATE.—I reported on the supply of this place on September 14.* I have since received another sample from the chairman of the local board of health, and the results of the analysis are practically identical with those obtained from the sample drawn by my assistant. It is therefore unnecessary to print the fresh analysis. The water, though hard, is certainly a good one.

In my next paper I shall refer to some of the supplies in the Isle of Wight.

A VILLA-HOSPITAL.†

BY FRANCIS VACHER,

Medical Officer of Health, Birkenhead.

MANY local boards have, since the passing of the Sanitary Act of 1866, made use of the powers therein (I believe for the first time) given, to provide temporary places for the reception of the sick, and there is abundant evidence that such erections afford certain advantages for the treatment of infectious cases, quite unattainable in permanent buildings. Some of these which I have myself visited appeared

* See SANITARY RECORD, No. 168, p. 167.

† A paper read at the Public Medicine Section, annual meeting of the British Medical Association at Manchester, August, 1877.

singularly well adapted for the purposes for which they were designed—simplicity of structure being combined with considerable completeness, and leaving little to be desired. Temporary hospitals are, however, not alike suited to all localities, and even where they have done and are doing good, they not unfrequently only partially supply the demands of the local community for accommodation for the subjects of infectious diseases. In rural districts the requisite provision is easily made. A fairly well-built detached cottage is to be found in most villages, and a very little fitting-up will convert it into a temporary hospital; or failing this, in any particular instance, one or two huts (so-called war huts), or even tents, may be readily extemporised. It is only in town districts that the problem how to provide efficient and sufficient accommodation for the infectious sick presents real difficulties. Here, in the majority of cases, there are no well-built detached cottages, and tents and military huts are quite out of the question, for the simple reason that there is no room for them; so that the choice lies between a permanent building of brick or stone and a temporary building of wood or corrugated iron. In large towns (towns with 80,000 inhabitants and upwards), the decision come to may be, and often has been, in favour of a permanent building; and in towns of less magnitude local authorities will generally be found to consider they fulfil their obligations by providing temporary hospitals. The initial cost of a good substantial building, which is a scarcely appreciable addition to the expenditure of a large town, becomes a primary consideration in an urban district where to meet it twopence or threepence would have to be added to the rates. Sometimes a sort of compromise is made, and it is determined to erect an exceptionally excellent temporary hospital, that is, one with stout brick foundations, the brickwork carried up a foot or more above the joists, the rest of the walls being iron, lined with hard wood, etc. But the objection to a building on this pattern is that it is likely to last too long, and it is needless to say that a temporary hospital for infectious diseases suffered to cumber the ground year after year, till it is practically permanent, soon becomes a nuisance.

While therefore there can be little difference of opinion as to the sort of accommodation for infectious sick, large cities and boroughs should supply, and the requisite provision for small urban or purely rural districts is a comparatively simple matter, the sanitary authorities of a great many important districts are still left in doubt as to what is the best course to pursue. I speak especially of manufacturing town districts, towns where the population ranges from 30,000 to 60,000, and the inhabitants of which belong almost entirely to the wage-earning class. Temporary accommodation sufficient for such a district would occupy a very considerable area, and there may be no suitable land for the purpose. Yet a permanent hospital, requiring less superficial space, and for which a site in a central situation might be readily obtained, would be altogether so costly that no one ventures to propose it. Local boards of urban districts, of the size and circumstances indicated, are composed mainly of local tradesmen, hardheaded thrifty folk who will not engage in any undertaking without carefully counting the cost. Supposing the local medical officer makes a formal requisition for a permanent hospital for the sick from infectious diseases, the first thing that will be asked for is particulars of the cost of any such hospitals which may have been erected, or are in course of erection, in other middle-sized towns; and the information adduced will be that Cheltenham has erected a hospital with fifty-two beds, at a total outlay of 188*l.* 9*s.* per bed, that Darlington has erected a hospital with forty-four beds, at a total outlay of 241*l.* 7*s.* per bed, and that Taunton is erecting a hospital with twenty-four beds, at an estimated cost of 141*l.* 12*s.* per bed, etc. What local board administering a manufacturing town district will approve an undertaking which requires so much capital to commence with? And I am not aware of any permanent hospital for infectious cases, with accommodation for less than sixty patients, where the prime cost of the establishment has been as low as that estimated for the Taunton hospital.

This is no imaginary difficulty, but one that has to my knowledge greatly embarrassed some urban sanitary authorities, who really wish to act for the best, yet dare not do anything 'ruinous.' We, as medical officers, looking only at the advantage to be gained by the proposed accommodation, are apt to make light of the first cost. We know that whatever the expenditure on a permanent hospital, it will be more than saved in the course of a year or two. But members of local boards cannot see the matter from our point of view; they think of the rates, already, perhaps, unusually high, and that if they added to the burden appreciably to build a hospital their constituents would remember it against them at the next election. The easiest way out of the dilemma is for the local board to postpone the question of building for the present, and in the meantime to make terms with the guardians for the admission of cases of infectious diseases into the Union hospital. This, I regret to say, appears to be the course most frequently adopted, and when such a proceeding is impracticable, or the guardians resist, the scheme most likely to commend itself is one for a hospital of the sort already referred to, which possesses the advantages of neither temporary nor permanent hospital, and some of the disadvantages of both.

Is there, then, no other way of providing accommodation for the infectious sick than by building a permanent or temporary hospital, or contracting with the guardians of the poor? Certainly there is. In Mr. Simon's 'Memorandum of Hospital Accommodation to be given by Local Authorities,' dated July, 1872, it is pointed out that villages should have the means of isolating four cases of infectious disease in at least two rooms, and it is suggested that a good cottage would answer this purpose. This, I take it, gives official sanction to the conversion of buildings already in existence to hospital uses. Once admit that a cottage may be fitly adapted for the purposes of a hospital for zymotic cases, and it follows that a villa, which is merely a cottage of a larger growth, may be fitly appropriated to the same uses. What is right for a rural district can hardly be wrong for an urban one. I submit, therefore, that when an urban authority is from considerations of economy prevented from erecting a permanent infectious diseases hospital, the next best course to adopt is to fix upon some conveniently placed residence in the locality and make a hospital of it. In selecting such a building, as in choosing a hospital cottage, great care will be necessary. It must, of course, be substantially built, thoroughly well-drained and dry, and if possible

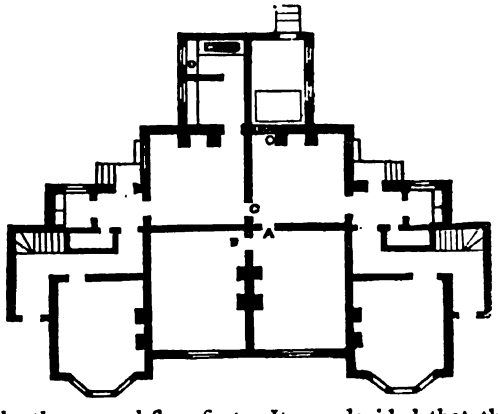
without cellars or rooms below the ground level. It should be not only detached, but on an open, airy site, and sufficiently removed from other residences, so that its conversion may not unduly depreciate the value of property in the vicinity. It is also well that it should be in a central position as regards the district, though this is of comparatively minor importance. And if good judgment is required in selecting a suitable building for the proposed hospital, it is assuredly not less required in planning the necessary alterations; but every sanitary authority has its medical officer and surveyor, and both these matters may be left in their hands.

In the district I serve, the want of a hospital for the reception of cases of infectious diseases had long been felt, but it was not till the autumn of 1875 that the sanitary authority definitely resolved to provide one. The urgency of this demand had been represented from time to time; but so long as the parish authorities were willing to admit into their hospital patients able to pay ordinary maintenance charges, the sanitary authority did not stir in the matter. There came a day, however, when the guardians passed a resolution declining in future to receive any but the destitute sick; and on this resolution being communicated to the sanitary authority, it was at once apparent that some accommodation for the infectious sick not brought within the operation of the poor-laws would have to be provided forthwith. As the town was not at that time threatened with an outbreak of small-pox, or continued fever, or other epidemic requiring immediate temporary hospital accommodation on an extensive scale, it was not thought advisable to put up wooden erections, and there was time for making more permanent provision. The suggestion to build a permanent hospital, which I need hardly say I was myself strongly in favour of, was next discussed. It was negatived not wholly on the score of cost, though this of course was not lost sight of, but there was a considerable difference of opinion as to the amount of accommodation there was occasion for, and there was a feeling on the part of the board that the provision made in the first instance had better be tentative. The alternative course, therefore, to convert an existing building, had to be accepted, and all that remained for the medical officer to do was to see that the building selected was not unsuitable, and that the conversion was as perfect and uncompromising as possible.

Fortunately the Birkenhead local authority was the owner of a pair of semi-detached villas, which several circumstances combined to point out as singularly well adapted for the purposes of a hospital. Placed in a suburban part of the district, and little more than a hundred yards from the park railings, these villas must have been originally most attractive residences; but shortly before I came to Birkenhead, the plot of land between them and the park was purchased for the erection of the Borough Hospital, a circumstance which I need hardly say rendered the villas less eligible for the purpose for which they were designed. When the hospital was built, not only did its back windows look out upon the side of one of the villas, but a portion of the hospital ground nearest the villas was selected as a site for a small mortuary. The result was that the two little eight-room houses, with their pretty gardens in front and behind, would not command a higher rent than 26*l.* apiece—latterly than 20*l.*—and even at this low rental good class tenants could not be secured.

Here therefore were a couple of well-built villas, being roughly treated by rough tenants, paying a poor rent, and that not easy to collect—villas which had already deteriorated, and were likely in course of time to degenerate into mere sublet tenements and become more and more troublesome to manage. As private residences their reputation was gone hopelessly. The question to be decided was, 'Were they capable of being converted into a good hospital for infectious diseases?' In company with the town surveyor, I went over the premises, and after a most careful examination we were able to report that they could be made into a good hospital. As regards the accessibility of the villas and their wholesomeness of situation, nothing better could be desired. Though at the outskirts of the town of Birkenhead, the villas are nearly in the centre of the urban sanitary district. The plot of land (firm boulder clay overlying the new red sandstone—an excellent foundation) on which they stand is 151½ ft. by 74½ ft. across, with a good road in front and at the back, and at the opposite side of each is a market garden. On one side of the villas is the drying ground of the Borough Hospital, and on the other side a vacant site, 151½ ft. by 82½ ft., belonging to the local authority, and thus available for the extension of the villa hospital when that may be necessary. The ground floor of the building is raised from two to four feet above the level of the surrounding land, and the space beneath the floor is ventilated. Four of the rooms in each villa appeared well adapted for wards, to hold two beds apiece, so that should there be several infectious diseases prevalent at the same time, the proposed hospital could afford accommodation in separate wards for the subjects of each disease.

The arrangement of the villas, and the alterations effected, are shown in the plans now submitted. The alterations are coloured in red (shaded). I will

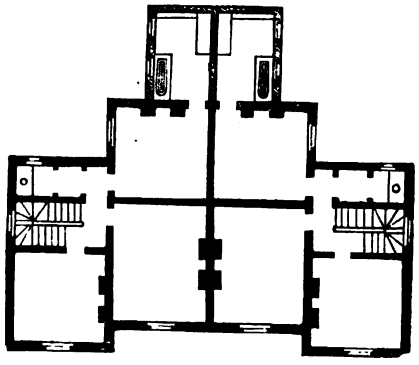


take the ground floor first. It was decided that the two parlours situated in the centre of the front of the block should be appropriated to the use of the married couple, the caretaker and matron of the hospital; with this view these rooms were cut off from the rest of the building by bricking up the doorways right and left, and opening two new doorways at A and B. A communication at C was then made between the two kitchens, the one to the right being retained as a kitchen, and the one to the left converted into a medical officer's room. The washhouse on the right was disconnected from the build-

ing, and access provided to it from the rear, in order that it might serve as a disinfecting-room, and the washhouse on the left was fitted as a dispensary and private bath-room. The two villa drawing-rooms, the only rooms on this floor for the reception of patients, were supplied with new bay windows, as figured in the plan. No alteration, as respects the arrangement of the rooms on the first floor, was necessary. The four front rooms serve as ordinary, the two back rooms as occasional, wards; but to provide bathrooms the part of the building originally planned as washhouses was carried up one story. The wards on the right side have been mainly appropriated to male patients, those on the left mainly to female patients; one of the wards on the female side of the block was, however, fitted with three little cots and a rocking-cradle, and special furniture suited to a children's ward. The upper rooms on either side serve as sleeping apartments for the nurses.

Thus it will be seen that the alterations as regards the arrangements of the block have been simple and easily effected. The position of the doorways into the caretaker's rooms has been changed. A doorway between the two villas and doorways to the new bathrooms have been made, and the washhouse behind the kitchen has been cut off from the main building, and another entrance to it made—*i.e.*, three doorways have been bricked up, and six opened out. The additions have been two new windows, two new bathrooms, and a third bath and closet. I may mention also that the syphons and soil-pipes of the existing closets were removed, and new ones supplied.

The further treatment the building was subjected to may be briefly summed up as follows: 1. The stucco was carefully removed from the outside, the face of the brickwork cleaned, and the joints raked out and pointed. 2. Two coats lath and plaster-work were added beneath the joists of the ground floor; all the drains laid in the voids below were opened up and examined, and the whole space



ventilated by the insertion of sixteen gratings 14 in. by 7 in.. 3. The whole of the interior was scraped and cleaned, and washed down with carbolic acid and water, the ceilings and walls repaired or renewed, and efficiently limewashed. 4. The floorings, wainscots, window-sashes, and all joiner's work within and without were repaired and made good, and efficiently painted. All stone and ironwork within and without was also made good and repaired, new lead sinks and several new firegrates being provided, and gas being laid on to every room in the house and to the passages. 5. Ventilators, 15 in. by 6 in., were fitted above the doorways of all the wards and nurses' rooms; and a Watson's Syphon Ventilator, 16 in. in diameter, was fixed in the roof over the head of each staircase.

As regards the outside alterations or additions—1. The old brick paving was removed from both the yards and replaced by good stone flags; the ashpits and outbuildings in connection with the same were removed, and a new ashpit, on an improved pattern, constructed. 2. The wall separating the two front gardens was removed, the whole extent of the boundary wall was raised, and a front entrance, with stone gate piers and gates provided. 3. A new washhouse, with boiler and furnace complete, was erected on a suitable site in the back garden of one of the villas. 4. A large iron disinfecting apparatus specially designed by myself, was made, and, with all the requisite appliances, fitted in the disinfecting room.

Plans and sections of the washhouse and disinfecting apparatus are submitted.

I have not described the alterations and improvements effected as fully as they would appear in a specification, but the particulars given will indicate that the conversion was intelligently planned, and as complete as possible. The work was inspected from time to time, and due care taken that it was all well executed.

As soon as the workpeople had finished, the premises were thoroughly cleaned, aired and dried, and the furniture selected and moved in. On February 13, 1876, the hospital was in thorough order, and received its first patient.

I come now to the consideration of cost. In view of the fact that the villas at the time they were handed over to the sanitary authority were in want of repairs, and that owing to the proximity of the Borough Hospital good tenants could not be obtained for them, the township treasurer estimated that taking them as they stood 25*l.* a-year was a fair rent, and this is what the sanitary authority has been charged. If, therefore, I put down the property as costing 500*l.* I allow full value. The alterations, including the sum paid for a new slate cistern erected some months after the rest of the work was completed, cost 502*l.* 10*s.* 1*d.*; and the disinfecting apparatus 50*l.* 8*s.* 5*d.* The furnishing in the first instance came to 291*l.* 15*s.* 1*d.*, and many additional pieces of furniture, subsequently found necessary and purchased in the course of the next fourteen months, came to 71*l.* 11*s.* 10*d.* To these sums I add the amount of the bill for dispensary fittings, drugs, and surgical instruments, 25*l.* 18*s.* 4*d.*, and the amount of the bill for hospital books, printed forms, etc., 9*l.* 12*s.* 3*d.* Taking out the totals the account stand thus:

	£	s.	d.
The Villas	500	0	0
Alterations and improvements	502	10	1
Furnishing	363	6	11
Disinfecting apparatus	50	8	5
Dispensary fitting, drugs, etc.	25	18	4
Hospital books, forms, etc.	9	12	3
Total	1451	16	0

This is the gross cost of the Birkenhead Fever Hospital—no item however trivial has been omitted. As there are eighteen beds, the cost per bed is 80*l.* 13*s.* 1½*d.* How much more it would have cost the Birkenhead authority to have built and furnished a hospital of equal capacity I am not prepared to say, but the experience of other towns in providing

infectious diseases hospitals warrants the conclusion that adapting is much less expensive than building.

Some of you may wish for information as to the cost of carrying on such a hospital as I have described. In Birkenhead the public accounts are made up from April to April, so I am in a position to give the particulars of the disbursements on account of the Fever Hospital for one year, viz., for the year ending April 24, 1877. The disbursements were as follows:

	£	s.	d.
Wages of caretaker and matron	78	0	0
Township rates, poor rates, inhabited house duty, and insurance	6	14	9
Nursing	77	6	3
Charing	17	1	11
Provisions	77	4	3
Coal and firewood	20	10	7
Gas and water	10	1	11
Lime-washing, etc.	6	18	9
Drugs	2	1	8
Cleaning materials	4	2	3
Sundries	9	13	11
Total	309	16	3

During this year just 100 patients were admitted into hospital; thus the cost per patient was a fraction under 3*l.* 2*s.* The cost per bed provided was 17*l.* 4*s.* 3*d.* Sometimes the hospital was without a patient for weeks, when an opportunity was afforded for limewashing and cleansing, and sometimes it was nearly full. The time each patient remained in hospital averaged eighteen days, and the average number in hospital at the same time was five.

The sum of the maintenance moneys paid by patients, or their friends, in the course of the year, was 154*l.* 3*s.* The disbursements therefore exceeded the receipts by 155*l.* 13*s.* 3*d.*—that is to say, the income was about half the expenditure.

I was induced to prepare this short paper because I believe that, with one exception, Birkenhead is the only urban district where the experiment of converting a villa or villas into an infectious diseases hospital has been tried, and I felt that some account of what had been done and what it had cost was the most useful offering I could present to the association. The exception I refer to is Hastings, where, under the auspices of the local authority, a villa has been converted into a hospital for infectious diseases, the accommodation provided being fourteen beds, and the total cost 1,600*l.*

In conclusion, I would remind you that I have not extolled the villa-hospital as preferable or even equivalent to a specially designed permanent hospital, but merely as an economical and fairly efficient substitute for this in districts in which the authorities will not sanction a large outlay. If the Birkenhead Health Committee had consented to be guided entirely by my advice, they would have erected a new building, to contain not less than fifty beds, and I should not have been able to publish this story of a Villa-Hospital.

INFORMATION of the occurrence of fires in Paris is to be communicated by telegraphic apparatus established throughout that city. In suitable and conspicuous positions in the streets it is intended to fix the communicator, covered by a small sheet of glass, or a glass cover in some form, upon breaking which, communication may be had, and information of fire sent to the nearest fire-engine station.

THE

SANITARY RECORD.

FRIDAY, DECEMBER 21, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

SANITARY ECONOMY AT ACCRINGTON.

A FEW weeks ago Accrington advertised for a medical officer of health. We have not seen the advertisement, apparently the amount of salary was not stated, but applicants were invited to tender. Two gentlemen applied for the office, one of them, Dr. Booth, the late medical officer of health, whose tender was 100*l.* per annum; the other, Mr. Ewart, who tendered to do the work for 80*l.* per annum. No local medical man opposed Dr. Booth's candidature. The result was that Mr. Ewart was elected by thirteen votes to Dr. Booth's three.

This Accrington election is not of mere local importance. The principles on which it was conducted and decided, and which cropped up during the inevitable discussion as to the qualifications and tenders of the two candidates, are of vital national importance, and affect the very core of our Imperial sanitary policy.

In the first place, it must be admitted that every sanitary authority has a perfect legal right to let its medical officership of health by tender to the lowest bidder. If it wishes to have half this sum repaid from the Imperial Exchequer, the appointment must be subject to the approval of the Local Government Board. This approval is rather a bugbear to ardent admirers of local self-government, for it carries with it a few conditions a little inconsistent with perfect liberty of control over the officer appointed. But these restrictions are so slight that they are practically *nil*. The only one of any moment is that the medical officer cannot be dismissed during his term of office without the consent of the Local Government Board. Practically this means that for one year, or at the most three, according to the sanitary authority's own primary wish, a medical officer need not fear dismissal for doing his duty.

Some sanitary authorities accept the Government grant, some do not. It is evident that the permissive feature is weak from a true politico-economical point of view. Why should one part of the community be taxed to pay the medical officers of health for another part? The present practice will not

hold water. If health expenses ought to be paid in part out of Imperial as opposed to local taxation, the whole country should benefit alike. If the system of Imperial control is good for sanitary goose, it is good for gander also. So there are already two important points raised by this Preston election, viz. the wisdom of its being lawful to put up such an office as that of health to public tender, and the vicious policy of paying local burdens here and there out of Imperial funds. Of course with this last question the question of Home Rule *versus* Imperialism is intimately mixed up.

Again, Accrington brings to the surface the legal qualifications desirable for a medical officer of health. Is one registered qualification sufficient, or should the holder of office be what is popularly termed 'a doubly qualified man?' As matters at present stand we think it highly desirable that the double qualification should be insisted upon, but it is better altogether to waive the question than to act weakly, as our Local Government Board do, sometimes giving their sanction to and sometimes pretending that they will decline to sanction singly qualified officers.

We have neither the inclination nor the right to urge the personal claims of candidates, but at Accrington it is evident that Dr. Booth owes his defeat to his outspokenness whilst in office, especially as to what is known as the 'open-midden nuisance.' Without doubt open middens are abominable nuisances, and the sickness directly attributable to them costs far more than their removal or amelioration would do. The midden champions at Preston also forget that the removal of the contents of open middens is much more expensive than the removal of tub-closets, so that on all sides, and on many accounts, open middens are expensive indecencies. No opinion in this place is intended to be expressed as to the intrinsic merits of tub-closets, but as the midden question was brought very prominently forward, and in an adverse manner to Dr. Booth, we are bound to endorse generally the thorough soundness of the late medical officer of health's views as expressed in his official reports.

As to the ethical side of the question, it must be admitted freely that when an office is offered to public competition it is competent for any person to apply, and to set what value he may choose on his services. Yet the medical profession is, or ought to be, above rating itself too cheaply, and should always be generous in its social ethical economy. We wish Mr. Ewart had entered the lists at the same weight as the gentleman whose re-election he opposed. Dr. Booth evidently has the sympathy and support of his local medical brothers, for none of them were candidates. The post of medical officer of health, when the whole time is not to be devoted to the work, will naturally attract two classes of outsiders—young men to whom the salary will help to keep on bread-and-cheese, while the office introduces them to practice; and rolling stones who have not gathered any moss.

The action and advice of the Local Government Board will be looked for with great interest in this case. While we certainly do not think Preston has, through its board, behaved wisely or kindly, we as certainly admit their right to avail themselves to the utmost of their legal position. It is only by such cases as this Accrington one that attention is drawn to anomalies and defects in our sanitary administration and shortcomings in its administrators.

Notes of the Week.

DR. ELLIOTT has been reappointed medical officer of health for Carlisle, the appointment to be terminable by six months' notice on either side.

MR. ARTHUR ANGELL, public analyst for the county of Hants, has been elected public analyst for the borough of Guildford. There were nine applicants.

THE Waterloo-with-Seaforth local board and urban sanitary authority, Lancashire, have increased the salary of Mr. Robert Thompson, their surveyor, from 200*l.* to 250*l.* per annum.

MESSRS. EDWIN FOX AND BOUSFIELD sold the fifth part of a king's share, and eighteen 100*l.* new shares, fully paid, in the New River Company, on the 13th inst., at the rate of 96,200*l.* for the king's share, and 310*l.* 11*s.* 1*d.* each for the new shares.

PRINCESS CHRISTIAN has sent a contribution to the funds of Mrs. Hilton's Crêche, in Stepney Causeway, of which her Royal Highness is the patroness, and in doing so has informed Mrs. Hilton that she has read the Sixth Report with great pleasure.

THE Birmingham children's recreation ground, four and a-half acres in extent, situate between Burbury Street and Berners Street, was publicly opened on the 30th ult., in the presence of nearly 20,000 people. The ground has been provided, at a cost of about 14,000*l.*, by Mr. William Middlemore.

DR. WHITMORE, in his last monthly report to the Marylebone Vestry, stated that amongst diseases of the zymotic class, measles continued by far the most prevalent and fatal, although from scarlet fever the deaths were considerably above the average. Typhoid fever had been unusually prevalent in many parts of the parish.

THE Uxbridge District Local Board of Health have resolved to oppose the Bill in Parliament promoted by the Metropolitan Board of Works for the water-supply. The Board's works are at Uxbridge Moor, rather more than two miles from where the Metropolitan Board of Works propose to obtain their supply.

MR. STANHOPE BULL, C.E., the county engineer and surveyor for Chester, after carefully investigating the various systems of ventilation, has adopted the system of vertical pipe ventilation invented and patented by Mr. Shorland, of the firm of Shillito and Shorland, Manchester, for the ventilating of the Magistrates' Sessional Court-houses and cells, Knutsford, Cheshire. Mr. Bull states that the work has now been completed, and the result is most satisfactory.

THERE were 204 applicants for the appointment of clerk and collector to the Radcliffe Local Board and Urban Sanitary Authority, Lancashire, at 130*l.* per annum.

AT Seaton, Devonshire, a resolution was passed, at a meeting of owners and ratepayers, some time ago in favour of its being constituted a Local Government district, but in consequence of some objection being raised against the voting, the Local Government Board did not issue an order; one of the ratepayers, however, having written to the Board, urging them to do so, they have now decided to hold a local inquiry.

MARLBOROUGH HOUSE.

WE are informed that, by command of H.R.H. the Prince of Wales, Sir William Gull made a thorough inspection of Marlborough House and the works in progress there on Saturday last.

THE VALUE OF SALT WATER-SUPPLY FOR FLUSHING SEWERS.

AT the last meeting of the Tynemouth Town Council the medical officer of health made a favourable report to the sanitary committee. The mortality during the month had been 18 in 1,000. Through flushing the sewers with salt water and taking other sanitary precautions, a fever which had threatened to be epidemic had been completely stopped. The medical officer stated he had never within his experience seen anything so remarkable in checking an epidemic as the sanitary measures which had thus been adopted.

WASTE.

DR. LEONARD writes to the *Times*: 'While we are receiving many tons of dead meat from the other side of the Atlantic in the most perfect state of preservation, we read with astonishment in the *Times* of Tuesday, that eight tons of fish were last week destroyed at Billingsgate Market, being unfit for human food,' and we ask the Fishmongers' Company how it is that so much excellent food caught at our own doors is allowed to go waste? Is no effort ever to be made to have chilled cells for the conveyance of so much valuable food from our prolific fishing grounds to market? On March 20 last, the Bremen Geographical Society gave a dinner of fish from the River Ob, in Siberia. They had been packed in ice and forwarded from Tobolsk, and arrived in perfect condition after a journey of 3,060 miles, though eighty-three days on the road. A moderate amount of energy and proper appliance seems to be all that is necessary to bring our fish fresh to market, from any part of the German Ocean and coast of Ireland.'

HYDROPHOBIA AND RABIES.

THE committee recently appointed by the Scientific Grants Committee of the British Medical Association 'to organise an inquiry into the causation, pathology, and treatment of rabies and hydrophobia,' consisting of Mr. Callender, F.R.S., Dr. Burdon Sanderson, F.R.S., Dr. T. Lauder Brunton, F.R.S., and Mr. Ernest Hart, desire to announce that they will feel favoured if any medical gentleman having under his care a case of hydrophobia, will kindly communicate with them. In any cases of hydrophobia or rabies in which a *post-mortem* examination is made, they will be glad to receive for investigation the following parts: namely, the brain, the spinal cord, the nerves leading to the part bitten, and the scar. These should be at once placed in a mixture of equal parts of spirit and water, and forwarded with as little delay as possible, together with a report of the *post-mortem* appearances, to the office of the British Medical Association, 36 Great Queen Street, London, W.C. The members of the committee are also anxious to have the opportunity of visiting cases of hydrophobia under treatment, or of attending any *post-mortem* examination in fatal cases. A preliminary meeting of the committee was held on November 12, at which, after the consideration of various letters and communications, a memorandum, prepared by Mr. Ernest Hart, was read and approved.

THE SEWAGE PROBLEM.

IT was very justly admitted, as a final conclusion arrived at during the late Conference at the Society of Arts, that 'no one system of dispersing of sewage can be adopted for universal use, and that different localities require different methods to suit their special peculiarities.' Every district will therefore be obliged to determine for itself whether its sewage shall be removed with or without an admixture of earth or ashes—whether it shall be water carried to its bourne, and whether that bourne shall be the meadow, the river, or perchance the sea. Before each finally decides, there must be consulted chemists, engineers, contractors, and goodness knows how many —isms, —onomies, and —ologies; of the latter, geology not being the least. There will also be the great trial case of Ordinary Filtration *v.* Downward Intermittent Filtration, and in the brief-bag will still remain the portentous bundle of Precipitation theories to argue and to expound to the vestry judges, and to a more or less intelligent jury of ratepayers. All sanitary districts must perforce go through the fell disease of sewage inquiry, and take the regular doses until the disease has run its allotted time. Fortunate will be those districts who can procrastinate until something like sound medicine replaces the many present nostrums, and until a State dispensary has been opened. At present it would appear as if the corporations of our large towns were on visits of inter-congratulation—there is so much hurrying to and fro—but instead, alas! they are only wearily visiting each other's irrigation meadows and sewage tanks, and tasting offered beverages of filtered sewage at the effluent's outfall. Joking apart, the question of the best methods of sewage disposal must, as Mr. Eassie says, 'have been the veritable query propounded by the ancient Sphynx.' It is proving, at all events, a teaser to the present generation.

THE POLLUTION OF THE THAMES.

THE Conservators of the River Thames, having requested Captain Calver, R.N., F.R.S., to direct his attention to the subject of the discharges of metropolitan sewage into the river at Barking Creek and Crossness, and the changes that have taken place in the bed of the river, that officer has prepared a report which has just been printed. The conclusions at which he arrives are that unquestioned documentary evidence shows that foul and offensive accretions have lately formed within the channel of the Thames; that a material portion of these accumulations are in the immediate neighbourhood of the metropolitan sewage outfalls, and that they have formed since the outfalls came into operation; that careful analyses show a perfect identity to exist between the constituents of the recently formed mud and those of the metropolitan sewage; that the sewage discharged at Barking Creek and Crossness contains matter in sufficient quantity to account for the mass of the new formations; that the character of the tidal streams in the neighbourhood of the outfalls as to direction and force is the effective cause of such accumulation; that the increase of soil in Woolwich Reach and elsewhere above the outfalls has been derived from the sewage discharge, and that the operation of accretion has been effected by the superior disturbing and transporting power of the flood stream, aided by the peculiar character of the suspended material; and lastly, that some statements connected with current action, and the purification of sewage after discharge, brought torward in support of the system of sewage discharge at the metropolitan outfalls, are not tenable. The 20th clause of the Thames Navigation Act of 1870 supplies, to a certain extent, a remedy for the evils thus pointed out. It provides that the Metropolitan Board shall, at their own expense, keep

the Thames free from such banks or other obstructions to the navigation thereof as may arise from the flow of sewage from their outfalls for the time being into the river. In view of the injury described in his report, Capt. Calver holds it to be urgently necessary that the Metropolitan Board should be called upon at once to dredge away those portions of the accreted matter which interfere with the convenience of navigation, and that they be requested to adopt such other arrangements as are calculated to prevent similar accumulations in future.

Law Reports.

DANGEROUS STRUCTURES.

MR. NAPIER appeared on behalf of the Metropolitan Board of Works to prosecute several summonses, one of which was against the owner of 13, Mortimer Street, Marylebone, and the other against the owner of No. 14 in that street. Mr. Napier said that some little time back a chimney stack fell over at No. 13, and brought down the party wall and all the back front, but luckily the district surveyor saw the danger that was imminent, and cautioned the inmates, who had time to escape. The surveyor subsequently condemned the remainder of the walls at No. 14, and the remnants of the roof and walls, with the exception of the last party wall, at No. 13. Mr. Mansfield made an order upon the respective owners to comply with the notice of the board within three days.

AN UNMUZZLED FEROCIOUS DOG.

T. HILL, of Lewisham, appeared to a summons charging him with suffering a ferocious dog to be at large unmuzzled, whereby Fanny Jefferies was bitten on November 5, on passing a passage at the side of defendant's house, a black retriever, ran out and flew at her, knocking her down, and biting her on the calf of the left leg, and on the inside of the thigh, from which she was still suffering. Two witnesses deposed to the same dog flying at them on October 15 and 31 respectively, both having their trousers bitten and that complaints had been made to the defendant. Mr. Slade said a dog at eighteen months was a full-grown animal, and it was known that retrievers were generally of a savage nature. There was evidence that complaints had been made to the defendant, and that the dog had been subsequently let loose and unmuzzled. For this offence the law imposed a penalty of 40*s.*, and gave the magistrates the power of awarding compensation to persons so injured not exceeding 10*l.* He should order both these sums to be paid, and 20*s.* costs—in all 13*l.*

PROSECUTION UNDER THE SEEDS ADULTERATION ACT.

AT the Mansion House T. Strangeways, a seed merchant, Mile End, was summoned for an infringement of the Adulteration of Seeds Act, 1869, in having with intent to defraud, sold killed seed, or seeds in which the vitality of germinating power had been destroyed by artificial means. He pleaded 'not guilty.' Mr. Besley, in opening the case, said the inquiry was the first which had been instituted under the Act in question. The practice of adulterating seeds was not only fraudulent, but highly detrimental to agriculture, and the statute was passed to repress it by more effectual laws than those previously in force. By it killing or dyeing seeds was prohibited, as was also the sale of such seeds, and for the first offence the penalty imposed was not to exceed 5*l.*, and for the second, or any subsequent offence, 50*l.* or under. The proceedings under the Act must be taken within twenty-one days. The object of killing seed was that it might not grow and betray its worthless character, for were it to grow the farmer would at once know that he had been defrauded, and that for which he paid 60*s.* a bushel, believing it to be turnip, or some such seed, was actually composed of 50 per cent. of weeds or spurious seed. On the other hand, if undiscovered it would be sown, and its failure would be attributed to natural or unavoidable causes. Ultimately the defendant, under his solicitor's advice, withdrew his plea of 'not guilty,' and urged that what he had done was not with any intention to defraud. The Lord Mayor fined the defendant 5*l.* for the offence of killing the seed, and 5*l.* for that of selling the killed seed, and 5*l.* 5*s.* costs, or 15*l.* 5*s.* in all.

A KNOTTY POINT AS TO THE WIDTH OF A STREET.

THE recent case of *Reg.* v. *Metropolitan Board of Works* raised a question as to whether the board are bound to make the new road from the bottom of the Savoy in the Strand up Casting Lane with a carriage way of 25 ft. in breadth from kerb to kerb. The Marquis of Salisbury has property at that spot, and there was a provision in the Act of 1875, introduced, for the benefit of his property there, that there should be 'a road' of 25 ft. in width, and the question was whether this meant 25 ft. of carriage way or 25 ft. of the entire breadth of roadway from house to house and including footway. The Board of Works took the latter view, and made the carriage way 16 ft. wide, leaving 9 ft. for footway. The Marquis contended that the carriage way ought to be 25 ft. wide. Hence the present application for a *mandamus* to the board to make the road 25 ft. in width. On the part of the Marquis, it was argued that by the express terms of the provision he was entitled to 25 ft. of 'roadway,' and that roadway meant carriage way. On the part of the Board, it was contended that this was in effect contending for a road 40 ft. wide, as there must be footpaths on each side of the carriage way, or the road would be dangerous. To this it was replied, that it was intended that the board should put footways on each side of the stipulated carriage way, and that the carriage way must be 25 ft. wide. But as to this it was denied, on the part of the board, that they had power to add footways, and so they urged that the road made as proposed would not be for the benefit of the public, however it might be for the benefit of the Marquis. The Court arrived at the conclusion that the Marquis was right. The Lord Chief Justice said he arrived at this conclusion with regret, for he thought that the board were right in their view, as a matter of judgment and discretion with a view to the benefit of the public; but they had made a certain bargain with the Marquis, and on the terms of that bargain, as contained in the provision referred to, the Marquis was right in his contention as a matter of legal construction, and therefore the Court was bound to grant the *mandamus* to make the road with the stipulated width of carriage way.

DRAIN CONNECTION.

MR. JUSTICE MANISTY, with a common jury, has had before him the case of *Searle* v. *Barnet Local Board*. This case raised a question of law of considerable importance to local boards of health, and to those who may be subject to their sanitary supervision. The plaintiff, in May of last year, had been informed by the defendants' surveyor that a connection ought to be made between his house and the main sewer. He had intended to do the work himself; but at 6 A.M. on May 29 the defendants' workmen, no notice having been previously given to the plaintiff, broke open a side gate, dug up a passage, and laid down a drain connecting the house with the main sewer. This work was done so negligently that the sewage percolated into the plaintiff's well, rendering it unfit for use. The case for the defendants was that they had served the plaintiff with notice before entering his land, and that the work done by them were executed with such care that leakage was impossible; but it was admitted that they had laid the drain-pipe across the top of the well. They, however, did not claim any credit for the novelty of the plan of laying drain-pipes close to drinking-water, for the *locus in*

quo showed that this device was included in the wisdom of our ancestors, there being two old drains near to the well, and a cesspool in its vicinity. The evidence for the defendants was that the water was impure before they had executed their works, and that the impurity was due to the surroundings already described. On this point the evidence was conflicting. The point of law arose thus. The defendants summoned the plaintiff, and an order was made upon him for payment of the costs of the work—26*l.* 16*s.* 11*d.* The contention on behalf of the defendants was that, as it was open for the plaintiff to have shown before the justices that the conduct of their servants was wrongful, he was estopped from going into that question on the present trial. In the result, however, the point became immaterial, as the jury awarded no damages for the wrongful entry. For negligence the jury returned a verdict for the plaintiff—damages, 15*l.*

Legal Notes and Queries.

RURAL SANITARY DISTRICT.—COST OF SEWERS.

THE rural sanitary authority of the K. Union propose to enter into an agreement with the urban sanitary authority of H. for the use of a sewer, which passes from the urban district along the highway through the rural sanitary district, to enable the rural authority to cause drains to be made from about thirty-five cottages and dwellings belonging to eight different owners, immediately adjoining such sewer, but situate within the rural sanitary district, and the urban authority propose to charge a rental of 3*l.* 15*s.* per annum on the rateable value of the buildings named. After the agreement has been entered into, the rural authority intend giving notice, under sec. 23 of the Public Health Act, 1875, to the above-mentioned owners to make covered drains from their respective properties, so as to empty into such sewer. After this work has been done, can the occupiers of the above-named cottages, as forming part only of a contributory place, be legally chargeable with such annual rate of 3*l.* 15*s.*, and the amount be recovered through the overseers as special expenses, or should such rental be charged upon the whole contributory place (see secs. 229 and 230 of Public Health Act)? S.

[The circumstances stated above show that the expenses should be charged to the whole contributory place.] —ED.

POLLUTION OF RIVERS ACT.

Where all the town sewage has been taken into the river flowing through a town previously to the passing of the Rivers Pollution Act, 1876, and also the private sewage, can any and what proceedings be taken against such council, and also against owners of private drains at the present time?

[It is quite clear that under sec. 10 of the Pollution of Rivers Act the town council can be proceeded against, unless they can show that they are outside the province of the Act by reason of the fact that they have adopted the best practicable means of rendering harmless the sewage matter discharged into the river under their auspices.] —ED.

THE POWERS OF SANITARY AUTHORITIES.

SIR,—Will you kindly answer the following questions in your next issue:

1. Have rural sanitary authorities power to order the analysis of suspicious drinking water?

2. Also have they power to compel persons building cottages, to build a privy, with ashpit, etc., to each (I mean when two or more are built in a row).

[1. We think they have a discretionary power to do so; and see section 70 of the 'Public Health Act,' 1875.

2. As to this see section 35 of the 'Public Health Act,' which absolutely prohibits the erection of houses unprovided with privies, etc., and an ashpit.—ED.]

BLACK SMOKE.

SIR,—In rural districts, where there are no by-laws, have sanitary authorities power to deal with black smoke issuing from chimneys of flour and other mills?

I have no doubt myself that it is a common nuisance, but mill-owners here think they can do as they please, as there are no by-laws in force.

[Black smoke from a mill, if a nuisance within section 91 of the 'Public Health Act,' 1875, may be dealt with by a sanitary authority, quite irrespective of the existence or non-existence of any by-laws.—ED.]

THE VACCINATION AGITATION.

AN urgent appeal has been laid before the Brighton Board of Guardians, asking them to refrain from prosecuting more than once those parents who omitted to comply with the Vaccination Act. The board resolved to take no steps in the matter, save to formally acknowledge the receipt of the document; but at the same time expressed a strong intention to do their duty under the Act with regard to subsequent prosecutions, it being observed that, after the very distinct ruling of the Lord Chief Justice, on a late occasion, they would be stultifying themselves to do otherwise. A member also added, that it was absurd to suppose that one penalty would absolve a man from the consequences of a series of omissions.

THE DOG-TAX.

IN reply to a suggestion that with the issue of the present form of dog license a metal label, bearing a district registered number, corresponding to that on the license itself, should be issued to the owner of every dog, and attached by him, under compulsion of law, to a suitable and uniform kind of collar to be worn by it, Mr. Wakeley, of Mapperley, Nottingham, has received the following letter: '11, Downing Street, Whitehall, December 3, 1877. SIR,—In reply to your letter of the 3rd instant, the Chancellor of the Exchequer desires me to inform you that the subject of the dog-tax is engaging his attention, and that he is considering whether any alteration is possible which may effect an improvement of the present system.—I am, Sir, your obedient servant, JOHN A. KEMPE.'

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

TORQUAY WATER-SUPPLY.

(*To the Editor of the* SANITARY RECORD.)

SIR,—The publication in the *Torquay Times* of analyses of water supplied to Torquay from Tottiford, taken from the SANITARY RECORD, has given rise to much comment, and to many inquiries as to the meaning of the three series of figures. There is unquestionably—assuming the figures to be correctly printed—a very extraordinary discrepancy between them, which it is absolutely impossible to explain. The three analyses are said to represent three samples of water taken.

1st. From a main tap at the engine-house, Town Hall.

2nd. From the 'service,' or Chapel Hill Reservoir.

3rd. From the main, as it flows into the Warberry Reservoir.

The Tottiford water flows fourteen miles through a single main to a point close to the Chapel Hill Reservoir.

At this point the main divides into two branches, the one delivering into the C. H. Reservoir, and the other directly, without any intermediate junction or connection, into the Warberry Reservoir. The engine-house is supplied from the C. H. Reservoir. How one and the same water comes to have 16·12 grains per gallon of solid contents at the C. H. Reservoir (which, by the way, I have not the least hesitation in saying it has not, and never had); 5·60 grains per gallon at the engine-house, that is after merely passing through a mile of pipe, and 19·50 grains at the Warberry Reservoir, that is after passing from the same point, through another mile of pipe in another direction, is an enigma difficult to solve. If we assume the figures to be incorrectly printed, we are faced by this difficulty, that the analyst in his comments states the hardness of the water to have increased between the C. H. and Warberry Reservoirs, that is between two points having no intermediate junction, from 1·9° to 10·1°, and that this marked difference caused him to inquire into the matter, only to discover that this exceptional impurity was probably due to a heavy rainfall that had just occurred. I must confess my inability to see how any rainfall, heavy or light, could have anything to do with the water in the main. I rather suspect, too, if water of 10° of hardness, or anything approaching it, had been sent into the town, something akin to a local revolution would speedily have ensued. The analyst, however, very properly concludes by the observation: 'This confirms the suspicion that it is a different water.' One can only infer from these curious facts, either from some accident or other, Torquay has been credited with the wrong water as far as regards the C. H. and Warberry reservoir samples; or that Mr. Little has been unable to resist so excellent an opportunity of playing a very neat practical joke at the expense of the SANITARY RECORD.

The figures appended to the engine-house sample, said to have been taken by the analyst's assistant, most closely resemble the Tottiford water, although the sample was not taken under the most advantageous circumstances. The present muddle very clearly demonstrates how very desirable it is that an analyst should be made fully acquainted with the detailed history of any sample of water he is called upon to examine, the want of which, in this case, has led to such remarkable discrepancies. The Tottiford water is further said to be 'pumped.' Nothing of the kind happens. The reservoir occupies an altitude of over 700 feet above sea level; the water flows, therefore, simply by gravitation into every part of the town. It is also affirmed that 'the water deposits so much solid matter in the mains that they have to be scraped every three months. The water deposits nothing of the sort; but owing to its softness, and freedom from lime and other salts, which commonly produce pipe incrustation, and to the great pressure, the unprotected iron of the mains becomes oxidised to such an extent as to materially impede the flow of the water, and, of course, to necessitate occasional scrapings; not every three months, however, but as I understand twice a year at the most. Nor do I think it possible, that even the veriest tyro in analysis, much less the well-known analyst in this case, if he clearly understood that all the water delivered into the town came from the granite, could have reported such water to contain sixteen to nineteen grains of solids per gallon. Certainly such a fact would be both unique and extraordinary, for it is well known that granitic waters are remarkable for their low solid contents, eight or nine grains per gallon being the outside limit.

With respect to the character of the Torquay water, only two previous analyses have, so far as I know, been published, the one by Dr. Frankland, published in a Blue Book, issued in 1874, the other by myself, in a paper read before the Torquay Natural History Society in November, 1873, and subsequently published in pamphlet form by the Local Board. Comparing the three analyses, as far as their relative completeness will allow, and taking, from the SANITARY RECORD series, the one of the water taken at the engine-house, we note the following:

	Per gallon. Frankland.	Per gallon. Smith.	Per gallon. Sanitary Record.
Total solids	4·452	4·650	5·60
Chlorine (as chloride of sodium)	1·960	1·280	1·64
Hardness	1·6°	·61°	1·4°
Ammonia	·007	·00023	·0088
Albuminoid ammonia (organic nitrogen)	·039	·0058	·0047
Nitrates	·0567		·0790
Nitrites	·0567		·0050

It should be noted that Frankland's sample was taken at Newton Abbot, under, I am informed, most exceptionally disadvantageous circumstances; the second was taken at Tottiford by myself; and the SANITARY RECORD sample was taken at the Town Hall, Torquay.

The most important figures in these analyses are those of ammonia and albuminoid ammonia, the latter especially so, as they represent unchanged organic matter in solution, which may possibly be of a kind capable of creating serious mischief when present in notable quantity. The two analyses which give albuminoid ammonia agree in this, that the amount present is so minute as to be practically of no moment, as little indeed as is normally found in the best and purest natural waters. Frankland estimates the organic matter, under the name of organic nitrogen, by a method of his own, which has not, however, met with the general assent of chemists, by some of whom indeed it is considered as exceedingly fallacious, consequently no comparison can be made between his organic nitrogen figures and those of the albuminoid ammonia. There is a wider difference in the ammonia figures. Assuming the correctness of each, it would imply that there is a gradual increase as the water flows through the main. This is not improbable; the joints of water mains are often fixed with tow and molten lead, the former being next the inside of the pipe. This would in a long main be quite sufficient to account for the increase of ammonia. This free ammonia represents organic matter that has undergone a certain change, and is in progress of further changes which ultimately render it inert. The amount in Tottiford water is not hurtful.

The nitrates and nitrites were at one time, by some chemists, considered of great importance, but so long as the albuminoid ammonia is as low as in Torquay water, they may be regarded as perfectly harmless, and no water, containing them, can on that ground alone be condemned. Some of the Bath and Burton waters hold somewhat large percentages of nitrates, derived at least in the former case, from the fossiliferous strata, through which the water percolates, but they are not therefore regarded otherwise than sound wholesome waters.

The total solids come out very closely in Frankland's and my analyses, a little higher in the other.

The chlorine is in each case well within the limits of a sound water. The water is found to be very soft by each analyst. In conclusion, I see no reason to doubt but that the Tottiford water is perfectly sound and wholesome, remarkably soft, and such as any community may be thoroughly well satisfied with. I am still of the same opinion, as expressed in my paper of 1873, that the use of cisterns, necessitated by an intermittent supply, is a source of much danger, and that on no account should any water drawn from a cistern be used for potable purposes without previous filtration, more especially during the warm summer months.

8, Strand, Torquay. EDWARD SMITH, F.C.S.

P.S.—Since the above remarks were in type, I have been favoured with a copy of the SANITARY RECORD, from which I find there has been an error in printing one of the figures relating to the 'service' or C.H. Reservoir. The total solids should be 6·12, not 16·12 grains per gallon as printed in the local paper. This, of course, remove the strange inconsistency between the total solids of the

C.H. Reservoir and the engine-house samples; but, on the other hand, it makes more glaring the extraordinary statement that 6·12 grains at one reservoir becomes 19·50 at the other, a mile of pipe being the only connecting link.

E. S.

LLANDUDNO WATER.

(*To the Editor of the* SANITARY RECORD.)

SIR,—In the SANITARY RECORD of October 12 last there is an analysis of Llandudno water, with a report thereon by Mr. Wigner, and the subject is again referred to in your issue of the 2nd ult. In both articles Mr. Wigner speaks most unfavourably of this water, and condemns it as an inferior specimen of a third-rate water.

Having been medical officer of health here for many years, and having always reported favourably to my employers, the Llandudno Improvement Commissioners, as to the quality of our water, I read these articles with profound astonishment. Though no recent analysis of this water had been made by any professional expert, no reason could be assigned for the least alteration in quality since it was analysed and favourably reported on by Messrs. Herapath and Muspratt some twenty-five or more years ago, for our supply now, as then, is solely obtained from the same deep springs of the Great Orme's Head.

Three years ago I reported to the Commissioners that our water-supply was becoming unequal in quantity to the growing wants of the place, that a constant service was much to be desired, and that such could only be obtained by bringing an additional supply from a distance.

I pointed out Llyndulyn lake, about 14 miles distant from Llandudno, as the nearest and best source whence this supply could be obtained, and the Commissioners deserve credit for the promptitude with which they responded to my appeal, for in the following session they applied to and obtained from Parliament the necessary powers to enable them to secure an abundant supply of this beautifully soft and pure water.

It would be presumptuous in me to question the accuracy of Mr. Wigner's analysis of the water put into his hands, but when I read his reports I could not come to any other conclusion than that the specimen he operated and reported upon was not a genuine sample of our water, but one that had been obtained from some contaminated source—possibly a foul cistern. Be that as it may, his reports have been most injurious to the reputation of Llandudno, and accordingly I urged the Commissioners to lose no time in submitting a genuine sample of our water to Professor Wanklyn, to be analysed and reported on; for if, on the one hand, our water was as bad as Mr. Wigner represented it to be, it was necessary they should know the worst at once; and if, on the other hand, it was as pure as we have always considered it to be, it was no less necessary that its purity should be confirmed by a competent authority, in order to satisfy and reassure the public mind, so disquieted by Mr. Wigner's damaging reports.

Here again the Commissioners responded to my appeal with praiseworthy alacrity, and the enclosed is a copy of Professor Wanklyn's elaborate analysis of our water, and of his favourable report thereon. I have no doubt you will gladly insert this in your next issue of the SANITARY RECORD.

This analysis and report, favourable though they be, are not a whit more favourable than I confidently expected they would be, for my experience of Llandudno water is now of nearly twenty years' standing, and I have always considered and upheld it as free from organic impurity, and as exceptionally good and wholesome for dietetic purposes. I know there are differences of opinion in the profession and out of it as to the relative merits of a soft and hard water for drinking purposes; but I am free to confess that the result of all my investigations is decidedly in favour of a moderately hard water such as ours—not merely because of its taste, which is delicious, but because of its wholesomeness and its nutritive properties. Lime when combined with carbonic acid, as it always is when water filters through chalk or carboniferous limestone, is also, I consider, an excellent tonic, especially for young people; and while thus aiding the assimilation of other food it helps to strengthen and develop the bony framework and every organ of the body.

In addition to this hard water is less likely than soft to absorb organic miasms, less likely to generate living organisms, and less likely to act on lead and other poisonous metals. It was, therefore, not on the ground of quality that I recommended the Commissioners to go to Llyndulyn for more water, but simply and solely because the existing supply was becoming inadequate to meet the requirements of a rapidly growing population. As it is we can afford 11 gallons per head of the population, even when the demand is at the greatest; but the supply is intermittent. I was desirous that the town should have a constant service, and the command of an unlimited supply for domestic purposes, for the flushing of the sewers, and for the watering of our streets. This we shall have when our new waterworks are completed.

JAS. NICOL, M.D.

Warwick House, Llandudno,
December 7, 1877.

[COPY.]

REPORT ON THE WATER SUPPLIED TO LLANDUDNO.

Two stoppered bottles filled with water, tied over and securely sealed, were received in my laboratory and examined. Each bottle bore the following label: "The water contained in this bottle was taken from the service reservoir, whence the whole town is supplied, by the clerk of the commissioners. The water was taken and the seal of the commissioners applied in my presence, this the 29th day of November, 1877. It is a fair and honest sample of the Llandudno water. (Signed) JAMES NICOL, M.D."

Both bottles were opened, and the water from each was separately examined as to organic purity with the following results:

Free ammonia	0·00 parts.
Albuminoid ammonia . . .	0·02 ,,

Showing almost absolute organic purity. Llandudno is in a mining district, and therefore a careful testing of the drinking water for poisonous metals is necessary. I have accordingly submitted the water to such testing, and am able to report that the poisonous metals are entirely absent. Like nearly all natural water, the water contains a little mineral matter in solution. This mineral matter has been carefully examined as follows: One gallon of the water yields 22·0 grains of solid residue (dry at 140° Cent.), part of which, consisting mainly of carbonate of lime, does not re-dissolve on being boiled with a quantity of distilled water, and the remainder, consisting of common salt and sulphates, dissolves in boiling water. The relative portions of the insoluble and soluble residue are as follows:

	Grains per gallon.
Insoluble residue	14·2
Soluble residue	7·8
	22·0

On submitting the 22·0 grains to further analysis they were found to contain:

	Grains.
Silica	traces
Carbonate of lime	11·0
Carbonate of magnesia	2·1
Sulphate of soda	2·1
Chloride of sodium	4·9

The hardness of the water is a little less than that of the ordinary London water. It is about 13°. In conclusion, I have to remark that I consider the Llandudno water to be of excellent quality, and that in the whole course of my experience I have not met with a better water for general domestic purposes. (Signed) J. ALFRED WANKLYN,

Laboratory,
7 Westminster Chambers,
London, S.W., Dec. 3, 1877.

Corresponding Member of the Royal Bavarian Academy of Sciences, etc., etc.

WATER ANALYSIS.

(*To the Editor of the* SANITARY RECORD.)

SIR,—I have read with great pleasure Mr. Wigner's admirable papers on 'Water-Supply of Seaside Places,' and have been struck with the great stress he lays upon the physical characters of the water. The idea has occurred to me of endeavouring to estimate the relative value of the several tests which he applies, with a view to seeing whether such an elaborate examination is requisite. With this object the results given by the examination of all the waters considered by Mr. Wigner as first-class have been collated, and also of those placed in the third-class, and all inconsistencies noted. Obviously the second-class waters can give little assistance, as in such we should expect to find good results with one test and bad with another. I have examined all the analyses published up to November 9, with the following results:

Loss on Ignition.

Among 38 first-class waters occur the following high values:

8·55 7·70 6·78 6·29 6·03
5·34 5·10 5·06 5·04 5·02

Among 29 third-class waters occur the following low values:

3·20 3·40 3·42 3·68 4·42

Chlorine as Common Salt.

Among 38 first-class waters occur the following high values:

13·46 8·42 8·31 7·96 7·13

And in 10 samples the amount is between 5· and 7· grs.

Among 29 third-class waters occur the following low values:

2·22 3·40 3·51

Three are between 5· and 7·; the rest are all higher than 7·.

Free Ammonia.

In the 38 first-class waters the following high values occur:

·0178 ·0135 ·0096 ·0049 ·0047

And in the 29 third-class waters the following low values:

·0012 ·0016 ·0016 ·0016 ·0016
·0018 ·0018 ·0020 ·0020 ·0020
·0021 ·0022 ·0024 ·0024 ·0029

Albuminoid Ammonia.

High value in 38 first-class waters:

·0064

Low values in 29 third-class waters:

·0024 ·0025 ·0026 ·0027
·0030 ·0035 ·0035 ·0036

Also 4 values between ·0040 and ·0055.

Nitrates.

High values in 38 first-class waters:

·8320 ·7900 ·6300 ·5380 ·5350

Low values in 29 third-class waters:

'Traces' ·0410 ·1472 ·2070 ·2400

Nitrites.

High values in 38 first-class waters:

·0170 ·0080 ·0200 ·0130

Low values in 29 third-class waters:

'Traces' in 8 samples. ·0030 in 4 samples.
·0040 in 2 samples.

Oxygen absorbed by Organic Matter.

High values in first-class waters:

·1220 ·1171 ·0780 ·0780 ·0700 ·0580

Low values in third-class waters:

·0032 ·0060 ·0064 ·0096 ·0120
·0140 ·0140 ·0140 ·0160

Colour.—In 3 of the first-class samples this is not directly mentioned. In the remaining 35 samples we find it characterised as 'slightly turbid,' 'yellowish (? from iron,)' 'somewhat turbid, but colour good.' In 2, 'slightly yellow from clay;' in 2, 'yellowish (? from clay;)' in 2, 'dirty yellow (? from clay;)' again, 'slightly yellow from iron,' and 'with an iron tint'—*i.e.*, faulty in some way in 11 samples. In 5 of the third-class samples it is not directly mentioned. In the remaining 24, we find it called 'very good' in 3, 'good' in 1, 'fair' in 3, and 'satisfactory on the whole' in another—that is, passable in 8 samples.

Taste.—In 2 two of the first-class samples it is not directly mentioned. Among the 36 other samples it is described as 'chalky' in 4, 'somewhat unpleasant' in 1, 'flat' in 2, 'flat and peaty' in 1—*i.e.*, faulty in 8. In 2 third-class waters it is not directly mentioned; among the remaining 27 it is described as 'satisfactory' in 1, and 'fair' in 3—*i.e.*, passable in 4.

Smell.—In 2 of the first-class samples it is not directly mentioned. Among the remaining 36 it is described as 'slight' in 2, 'slightly peaty' in 1, 'flat' in another, 'offensive, flat, and peaty' in another—*i.e.*, faulty in 5 samples. In 3 of the third-class samples it is not directly mentioned. Among the remaining 26 it is described as 'fair' in 3 samples, 'satisfactory' in 1, while 2 were 'comparatively free from smell'—*i.e.*, passable in 6 (? 4).

Microscopical Appearances.—The 38 first-class waters showed 'vegetable matter' in 3 instances, and 'a yellow residue (? iron)' in 3 other cases—*i.e.*, faulty in 6 cases. In 3 of the third-class waters, not directly mentioned among 26 others, described as 'fair,' 'fairly satisfactory,' 'residue mainly earthy,' 'more satisfactory than last'—*i.e.*, passable in 4 cases.

The interpretation of the above results is far more difficult and uncertain than their collection. In no case has Mr. Wigner placed a water in the third class which did not show some bad physical character, and in no case has he admitted a water with any distinctly bad physical character into the first class. On the other hand, many samples, which had passed the chemical tests creditably, were rejected after physical examination. As far as I am able to judge, the determination of *nitrites* seems to be of little or no use, that of *free ammonia* comparatively valueless, *oxygen absorbed by organic matter* and *loss on ignition* of little more value, while many third-class waters contain very little *albuminoid ammonia*. Seaside wells may contain chlorine to any extent, but its determination is easy, and sometimes important. Is it not desirable to determine the amount of *sulphates*, at any rate where there is much permanent hardness?

The physical examination (in conjunction with source of supply) appears to me to be the most important, and especially the microscopic appearances. For the latter I would suggest, to those who have not already adopted the method, allowing the water to stand for twenty-four hours or longer in a Mohr's burette or vessel of similar shape, and then drawing it off from the bottom *guttatim*. Might I suggest to Mr. Wigner to state the *hardness* last, and in two columns, for convenience of reading, especially when the results of analysis of two samples are printed side by side? Again, in a few instances, the examination of colour, taste, and smell, though doubtless made, is not recorded.

Is there any possibility that chemists will agree to some scale for recording results of water analysis? Cannot the Society of Analysts or the new Institute of Chemistry do something? Do let us have one standard, either 'grains per gallon' or 'milligrammes per litre.' Professor Wanklyn's double scale is even more objectionable than Dr. Frankland's 'parts in 100,000.' To turn from Mr. Wigner's figures to Professor Wanklyn's book, and then to the reports of the Rivers Pollution Commissioners, leaves the mind in hopeless confusion.

G. B. LONGSTAFF, M.B.
Southfield Grange, Wandsworth, S.W.

ANIMAL VACCINATION.

(*To the Editor of the* SANITARY RECORD.)

SIR,—Small-pox is once more assuming formidable proportions in the East-end of London. It is difficult, if not impossible, to doubt that deficient vaccination lies at the root of this and all other similar outbreaks—defect either in regard to the imperfection of the operation actually performed or inadvisability of the process as prescribed by law. It is useless to flinch the fact that so long as one tittle of rational objection to compulsory vaccination is left for anti-vaccination partisans to stand on evasion of the law will continue, to the vast detriment of the public and the multiplication of misery and mortality in the case of children and persons of insufficient intelligence to avail themselves of the immunity provided by Jenner's discovery. It is useless to deny that vaccination by human lymph involves danger of scrofulous, syphilitic, and erysipelatous inoculation. The difficulty of securing with absolute certitude subjects for furnishing vaccine lymph free from constitutional taint is simply insuperable, and the sooner this fact—which few, rather, I would say, no scientific physiologist, no thoughtful medical practitioner of wide experience contests—the sooner, I say, this fact is practically reckoned with and the only effectual means taken to obviate it—the sooner animal vaccination will become feasible, nay, popular, and, whilst truly prophylactic against small-pox, will case to give rise whether to such catastrophes as so lately occurred at Sheffield or the almost equally disastrous fear thereof, as I have said in a letter the editor of the *Daily News* did me the honour to insert in Saturday's impression, the 8th inst., in which you may find stated: 'Unless the Belgian Government and the heads of the profession in Belgium and America are judicially blind, or in a conspiracy to impose on their own countrymen and the rest of Europe, the system they advocate and pursue is at least as effective as our own as a safeguard against the specific complaint of small-pox, whilst it affords the gratifying certitude to parents that no erysipelatous, scrofulous, or other form of infection whatever can be communicated by the process.'

I hope very soon to see the use of animal vaccine universally adopted in private practice by my medical brethren. Its use is already rapidly extending, but I do not scruple to insist in the strongest terms that it is the duty of the Government in enforcing compulsory animal vaccination to consult the safety of those who willingly submit to its prescription, and to cut the ground from all recalcitrants by immediately adopting vaccination by pure animal lymph, for the absolute safety and superior efficacy, of which we have the word, not of private speculators or a few men of science, but of the Belgian Government and the whole of the medical faculty of that country, with Dr. Warlomont at its head. THOMAS WILSON.

Alton, Hants, Dec. 11, 1877.

THE ROYSTON BOARD OF GUARDIANS.

(*To the Editor of the* SANITARY RECORD.)

SIR,—In an article on the proposed amalgamation of the offices of relieving officer and inspector of nuisances in the Royston Union, you state that a certain course was adopted by the '*Chairman* of the Board of Guardians.' I wish to correct this. Mr. E. K. Fordham, the '*Vice-chairman*,' presided on the occasion to which you allude, and uttered the statements about the St. Neot's Union, which you allege are incorrect. The arguments used by Mr. Fordham, if stated correctly in the Royston paper, were these: First, that as the relieving officers were in the habit of attending stock and other sales, they had sufficient time to do the sanitary work; and, secondly, that the amalgamation of the two offices (relieving and sanitary) have been tried in the St. Neot's Union, and that the trial had succeeded. It appears that both these statements are erroneous.

I wish to disclaim having taken the part attributed to me for two reasons: first, I am not in the habit of making erroneous statements; secondly, I am utterly adverse to the proposed amalgamation of the two offices, and agree with you in thinking that it would render the Sanitary Acts in the Royston Union absolutely useless.

HENRY PERKINS,
Chairman of the Board of Guardians of the Royston Union.

Sanitary Inventions.

ZUCCATO'S PATENT PAPYROGRAPH.

MANY of our readers must have experienced the want of some simple and easily used contrivance for the production of copies of papers of which a sufficient number is not required to incur the expense of letter-press or lithograph printing. Persons with no previous knowledge of the art and mystery of setting type, and unskilled in the use of a printing press, cannot afford the time necessarily required for the acquisition of the manual dexterity essential for the rapid and satisfactory performance of the operations of type-setting and the production of impressions. Even when these difficulties have been mastered, printing from types with all the paraphernalia of presses, rollers, ink slabs and type, is a process scarcely fit to be carried on in a well-ordered office or snug library on account of the dirt, and the space required for the various appurtenances. The Papyrograph requires no previous knowledge for its efficient use, and the process is simplicity itself. An ordinary copying-press provides sufficient power to produce the most satisfactory results, while the whole of the additional apparatus of the system occupies but the space of a thick folio volume. When not in use, it may be packed away in any odd corner, but is ready for work in a few moments when required. The process consists of writing in the ordinary way upon specially prepared paper, with a chemical ink, of which the composition is not divulged.

By the action of this ink, every line made by the pen is, as it were, stencilled through the paper, in fact partial destruction of its fibre is the effect produced. Thus prepared, the printing process may be at once proceeded with. A pad is saturated with ink, upon this the written sheet is laid, covered with a sheet of zinc keeping the paper in place, but not covering the written portion. To print, a sheet of plain paper is laid upon the stencil, the cover brought down, and pressure applied. With a few hours practice eight or more impressions per minute may be produced, and 500, if wanted, obtained from one prepared sheet; which may be saved for future use, should further copies be wanted. It is almost impossible to enumerate the varied uses to which this ingenious and useful invention may be successfully applied. Among them, as most interesting to our readers, may be mentioned obtaining copies of official notices, copies of minutes of the proceedings of sanitary boards and other public bodies, circulars, notices of meetings, etc. Plans, drawings, and specifications of patents, and all other written matter or sketches are produced in exact and permanent *facsimile*, the artist's most delicate touches being faithfully and characteristically rendered. It is scarcely necessary to add, that the apparatus is already in extensive use, giving satisfaction in every case where the directions are carefully attended to. Messrs. Henry and Co., 92, Strand, London, are the patentees.

ALLEN'S BRONCHITIS KETTLE.

THE most eminent medical authorities acknowledge the value of warm moist air in the treatment of asthma, and other bronchial affections. To produce the state of atmosphere so beneficial in such cases is sometimes a matter of difficulty, and even when the directions of the medical attendant are clearly given, in the absence of an apparatus especially adapted to the purpose, the most

absurd mistakes are made by those who attempt to carry out his suggestion. We have in memory a case in point. A child suffering from bronchitis, and in a dangerous condition, lost his life through a blunder. The instructions to fit up a makeshift for a bronchitis kettle were carried out by the nurse in such a stupid fashion as to result in an uncovered saucepan of boiling water being placed on a hob, whence, of course, the steam passed up the chimney, instead of into the room. On the next visit of the medical man, the little patient was beyond the hope of recovery. Had a suitable and efficient apparatus been used on this and on many other occasions, though the disease might not have been cured, yet a most valuable remedy would at any rate have been tried.

The articles under notice are made in two varieties to suit the necessities of various cases and the convenience of patients. In some instances the whole apartment is required to be permeated by a moist air produced by the steam passing from the extended spout of the kettle into the room. This is provided for by the receptacle intended to be placed over a fire. When required for the inhalation of warm vapour, the apparatus heated by a spirit lamp is the most convenient, as it may be placed upon the table, on a chair by the bedside, or in any other convenient position. Both kinds of kettle have a receptacle for medicated substances, the vapour from which mingling with the steam passing from the tube has been found of benefit in many cases. It is, of course, intended that these apparatus should be used according to the directions of the medical attendant. They are plain and substantial in appearance, strongly made, and sold at a price placing them within the reach of all by the inventors, Messrs. J. Allen and Son, 64 and 65, Marylebone Lane, London, W.

Notice of Meeting.

THE SANITARY INSTITUTE.

THE Council of the Sanitary Institute have resolved to hold a public meeting on May 30 next, and the two succeeding days, for the discussion of the following subjects: 1. The Pollution of Rivers, and the Acts passed in 1876 for the Preservation of the same. 2. On the Principles of Water-supply for London. Persons desirous of taking part in the discussion are invited to do so; and to facilitate arrangements are requested to inform the Council the subject upon which they desire to speak.

ERRATUM.

Read 'Buchan' for 'Buchanan,' line 2, page 387, SANITARY RECORD, Dec. 14.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

ANGELL, Mr. Arthur, has been appointed Public Analyst for the Borough of Guildford, at 25 guineas per ann., and 2*s.* 6*d.* for each analysis and report.

BRODERICK, Mr. William, has been appointed Clerk and Collector to the Radcliffe Local Board and Urban Sanitary Authority, Lancashire, vice Sharples, resigned, at 130*l.* per ann.

COOPER, Mr. Charles John, has been appointed Clerk to the Much-Wenlock Local Board and Urban Sanitary Authority, Salop, vice Blakeway, deceased.

CRAMPTON, Mr. Thomas Hunt, has been appointed Clerk to the Cranbrook Guardians and Rural Sanitary Authority, &c., vice Farrar, deceased.

DAVIS, Edward William Stephen, M.R.C.S. Eng., L.S.A. Lond., has been re-appointed Medical Officer of Health for the Mountain-Ash Urban Sanitary District, at 40*l.* per ann. for five years.

HAMMOND, Robert E., M.R.C.S. Eng., has been re-appointed Medical Officer of Health for the Gorton Urban Sanitary District, Lancashire.

HUGHES, Hugh Robert Greig, L.R.C.P. Edin., M.R.C.S. Eng., has been appointed a Certifying Factory Surgeon for the District of Bangor.

LEATHLEY, Mr. Benjamin, has been appointed Clerk, Inspector of Nuisances, Collector, &c., to the Altofts Local Board and Urban Sanitary Authority, Yorkshire, vice Walker.

MCBEAN, Mr. James, has been appointed Inspector of Nuisances and Collector to the Abertillery Local Board and Urban Sanitary Authority, Monmouthshire, vice Williams, resigned, at 85*l.* per ann.

MCKEAN, Andrew, Esq., has been appointed Treasurer to the Brownhills Local Board and Urban Sanitary Authority, Lancashire.

MILLIGAN, William, L.R.C.P. Edin., M.R.C.S. Eng., L.S.A. Lond., has been appointed Medical Officer of Health for the Wirksworth Urban Sanitary District, Derbyshire.

POOLE, Mr. William Savage, has been appointed Clerk to the Kenilworth Local Board and Urban Sanitary Authority, at 50*l.* per ann.

PURKISS, Mr., has been appointed Surveyor, Inspector of Nuisances, and School Attendance Officer to the Corporation and Urban Sanitary Authority of Andover, vice Marsh, whose appointment has expired, at 140*l.* per ann.

STANLEY, Mr. Thomas Howard, has been appointed Clerk to the Brownhills Local Board and Urban Sanitary Authority.

STEBBING, Mr. William, has been elected a Member of the East Dereham Local Board and Urban Sanitary Authority, vice Mackie, resigned.

WEBB, Matthew, Esq., has been elected Chairman of the Brownhills Local Board and Urban Sanitary Authority.

WILKINSON, Mr. Oswald, has been appointed Public Analyst for the Borough of Stockport for one year, vice Raynor, whose appointment has expired, at 10*s.* 6*d.* for each analysis, except water, and 21*s.* for each attendance in Court.

VACANCIES.

BECCLES, CORPORATION OF, AND URBAN SANITARY AUTHORITY, Suffolk. Election, January 1. Application to the Town Clerk.

BRIDLINGTON LOCAL BOARD AND URBAN SANITARY AUTHORITY, Yorkshire. Surveyor and Inspector of Nuisances: 70*l.* and 50*l.* per ann. Application, 24th instant, to Charles Gray, Clerk to the Authority.

SALFORD URBAN SANITARY DISTRICT, Lancashire. Inspector of Nuisances. 80*l.* per ann. Application, 26th instant, to Chas. Moorhouse, Town Clerk.

SMALLTHORNE URBAN SANITARY DISTRICT, Staffordshire. Inspector of Nuisances. Election, January 2. Application to Wm. Tomkinson, Clerk to the Authority.

THETFORD, CORPORATION OF, AND URBAN SANITARY AUTHORITY, Norfolk. Collector and Inspector of Nuisances. Application, stating Salary required, 5th January, to John Houchen, Town Clerk.

SANITARY PATENTS.

3615. An improved alarm bell for warning foot passengers on the approach of bicycles, tram cars, and other carriages. Frederick Leonardt, Birmingham.

3637. Improvements in apparatus for lighting, warming, and ventilating purposes. Charles George Virgo and Abraham Akeroyd, Bradford.

3704. Improvements in sewer or drain traps. Robert Benjamin Cole, Hoxton, London.

3724. Improvements in water filters. Edwin Powley Alexander, Southampton Buildings, London. A communication from Frederick Walbroth and William Nugent, New York.

3746. Improvements in and connected with apparatus for sweeping or cleaning chimneys. John Trench, Paisley, N.B.

ABSTRACTS OF SPECIFICATIONS.

751. Invalid beds. J. Newham.

The mattress is made of two separate parts, and the foot part can be slid away from the other, leaving a space for introduction of a rectangular bed pan slid from the side, and having its upper face flush with the top of the mattress. The head part of the mattress is hinged so that it can be raised into an inclined position and supported, a V-shaped space being formed in it at the joint. Loops are passed round the patient's arm and connected by cords passing over pulleys at the head of the bed to mechanism for raising and hauling him towards the head of the bed.

966. Separating fluid from solid portions of sewage, peat, etc. W. C. Sillar.

The matter is placed in a cylinder over a layer of straw or other filtering substance, and compressed by a piston subjected to percussion.

NOTICE.

THE SANITARY RECORD *is published every Friday morning, and may be ordered direct from the Publishers. Annual Subscription, 17s. 4d.; free by post, 19s. 6d.*

Reading Covers to hold 12 numbers of THE SANITARY RECORD *have been prepared, and may be had direct from the Publishers or through any Bookseller, price 3s.*

Original Paper.

WHY SHOULD THE EXISTING WORTHLESS SYSTEM OF REGISTERING SICKNESS BE LONGER PERPETUATED?

BY DR. CORNELIEUS B. FOX,

Medical Officer of Health for East, Central, and South Essex.

THE necessity of a complete and accurate system of registering disease will be admitted by all those who are acquainted with the very alphabet of State Medicine to be urgent, if any decided success is to be achieved in the prevention of the spread of filth diseases, and if any advance is to be made in our knowledge of the natural history of other diseases. An eminent writer has recently thus publicly spoken respecting this want: 'The first sanitary work of the future, standing before all other sanitary legislation (except the formation of an efficient central department of health acting under the direction of a Minister of public health), is the systematic enumeration, week by week, of the diseases of the kingdom, throughout its length and breadth. It is utterly hopeless to attempt any decisive measure for lessening the mortality, which is certainly more than double what it ought to be, until this State labour is faithfully carried out. To know the diseases of this country in their entirety, to know the relation of the diseases in men to the diseases in inferior animals and plants, to be able to fix the special localities of special diseases, to be able to trace the diseases back to occupations, modes of life, and all the external exciting causes from which they spring, were knowledge which every statesman surely should long to acquire. Such knowledge is the best history, the best book of reference that could be obtained, from which to read the health, and thereby the wealth, of our people.'

The subject of the following remarks may be conveniently divided into three heads:

1. A brief description of the existing system, if it can be dignified by such a term;

2. The proof that such a system is worthless; and

3. An attempt to find an answer to the query which forms the title of this paper.

1. *The existing system of registering sickness.*—The medical relief list of the union medical officer, which is intended to contain the name in full, the age and residence, the medical visits and extras in food, the quantities of brandy, port wine, etc., received by every pauper, is the principal existing record of the great mass of sickness throughout the country generally, the registers that are kept in public medical institutions, such as lunatic asylums, etc., being alone excepted. This poor-law record is of a very short-lived nature. It was never designed to furnish material for statistical purposes, and generally soon finds its way into the waste-paper basket. Dr. Richardson has endeavoured to carry out on a small scale an experimental plan for the registration of disease. In 1855 he arranged with as many as fifty medical observers, from forty-four different stations, extending from St. Mary's, Scilly, to Lerwick, in the Shetland Isles, to send him information as to the epidemic diseases—diseases affecting the lower animals and plants—and certain meteorological observations which were published quarterly in a journal of public health. These returns were continued regularly for four years. Dr. Richardson writes of this attempt thus:

'The success of the experiment for the registration of diseases was the actual cause of its failure. It was impossible for any one individual to bear the labour and the expense of collecting and publishing regularly the returns of disease from fifty observers, though their valued labours were freely given. When, therefore, the experiments had been fairly tried and shown to be practicable I laid the results before Sir Benjamin Hall, who was for a time President of the Board of Health, and suggested to him that the weekly records of the union medical officers of the kingdom should, by a very simple modification, be utilised for registration of disease, after they had served the primary local purpose for which they were intended. Sir Benjamin Hall received the scheme with much favour, and promised to take the opinion of the Registrar-General upon it; but after a little time he informed me that the carrying out of the design would involve an expense which the public, he believed, would hesitate to meet, so the effort was not made.'

Dr. Richardson proposes, then, to utilise the 3,200 returns of sickness which have been calculated to contain not less than 3,500,000 cases of sickness per annum that are weekly sent by the medical officers of the Poor-law districts to their boards of guardians, and work them into a system akin to that of the registration of deaths, which has been carried to so high a state of efficiency. If he knew so much of the 'beef-tea and brandy lists,' as the medical relief lists have been contemptuously called, as do medical officers of health, he would not urge the development of what I shall hereafter show to be a sham system of registering sickness (restricted to a certain section of the community, that is, those relieved at the expense of the rates) into what is required, namely, a national system, limited to no class, for the very excellent reason that disease is not confined to a class, laid down on lines parallel to those systems for the registration of births and deaths of which, notwithstanding their imperfections, we as a nation are rightly proud.

2. *The proof that the existing system is worthless.*—If a system for the registration of sickness is to be of any value, information of the following kind is essential—(*a*) Sex of each sick person; (*b*) age of each sick person; (*c*) residence of each sick person; (*d*) nature of disease, in accordance, for the sake of uniformity and precision, with some recognised arrangement or classification, such, for example, as that of the Registrar-General, or the nomenclature of diseases which was prepared some years ago by the College of Physicians for the use of the medical profession.

Let anyone examine the accompanying collection of entries which have been copied out of records of sickness that are now expected to form the material out of which are manufactured the quarterly reports that the Local Government Board demands from medical officers of health:

Nearly every entry contains one or more sins of omission or commission, and is not only worthless in itself, but invalidates the accuracy of the sickness return in which it appeared. These entries were not

* Read at the Social Science Congress, Aberdeen meeting, 1877.

all picked out of the medical relief lists of some one lax board of guardians.

I have several times been frankly informed by union medical officers that they do not often insert in their returns half the pauper cases which they attend. It may be asked: (1) Why do not union medical officers fill up their medical relief lists with greater accuracy? and (2) If they will not, cannot they be compelled to do so? The answer to the first interrogation is, that union medical officers are well aware that these sickness returns were never designed for statistical purposes, but simply for the information of the guardians as to the number of cases attended and the extras ordered by the medical

COMIC SICKNESS RETURNS.

Name of Pauper	Age	Residence	Nature of Disease	Remarks
B——y, Mary	7	Parish on	Sore throat	These four cases were all probably either scarlet fever or diphtheria.—C. B. F.
,, Rosamund	4	,,	Scarlatina	
,, Philip	1	,,	Diphtheria	
,, Freddy	10	,,	,,	
Robert P.'s wife	69	No entry	Uterine	
M——y, Joseph	61	Parish only	Inflammation	
W., Lucy	6	,,	Congestion	
Playle's family	No entry	,,	Whooping cough	
P., Sarah	69	Village	Congestion	This case is likely to terminate in gangrene
P., Thomas	65	No entry	Bedridden	
S., Mary	8	Scrofula	No entry	
D., John	64	No entry	Constipation	
P., Mrs.	54	,,	Bilious	
A.'s child	13	,,	Typhoid fever	
P., Ann, and family	No entry	Parish only	Scarlet fever	
A., Jane, and family	,,	,,	,, ,,	
R., Joseph	60	,,	Short breath	
U., C.	No entry	,,	Itching	
H., Mrs.	,,	No entry	No entry	
B., John	,,	Parish only	Bad eye	
W. G. and children.	38	,,	Inflammation of covering of membranes of heart and catarrh	
A.'s wife	60	,,	Cough	
Saltmarsh	5 and 7	,,	Bilious	
R.'s four children	No entry	No entry	No entry	
A. M.	43	Parish only	Injury	
W.'s child	6	,,	Pulmonary	
R.'s three children	No entry	Residence given	Whooping cough	
Sh., Mr.	,,	Parish only	Pregnancy, etc.	
B., John	,,	,,	Severe cold and brain irritation	
C. Smith	,,	,,	Hæmorrhage	
No entry	,,	No entry	Decay	
Lilly (twins)	Four months	Parish only	Dyspepsia	
T.'s child	Two months	,,	,,	
M. B.	No entry	No entry	Confined	
B.'s five children	,,	Parish only	Bronchitis	
B. S.	75	A—— Place. No entry of parish	No entry	
Lowe, widow	No entry	P—— Cottage. No entry of parish	,,	
A. B.	,,		Eruption	
C. D.	,,		Bad leg	
E. F.	,,		Brain irritation	
G. H.	,,	Parish only	Infirmity	
Y. Z.	78	,,	Dirty	
R. N.	46	,,	Bilious fever	This case on investigation proved to be one of shingles.—C. B. F.
O. P.	16	,,	Disease of eyes	
A. Miss	No entry	No entry	Heart affection	
W. M.	64	Residence given	Eccentric in manner	
T. S.	No entry	No entry	Ulceration	
S. E.	13 months	Parish only	Compound fracture of humerus and fracture of scapula, abscess of axilla, congestion of lungs, and chicken-pox	
B.'s child	2	No entry	No entry	

officer. Moreover, these diligent workers in the medical hive, whose lives are distinguished by much toil and little pay, are already insufficiently paid for the services rendered by them to the ratepayers. The answer to the second question, as to whether they cannot be compelled to exercise greater care and accuracy, is in the affirmative. Complaints have been made by medical officers of health to boards of guardians, who have sent written expostulations to their union medical officers which have had for a time a beneficial effect, and then a relapse to the old slovenly ways has occurred. Then a complaint to the Local

Government Board has been made on the subject, which has resulted in a communication from that board to the sanitary authority acting for the board of guardians. Another remonstrance from the sanitary authority to the union medical officers is the the next step, followed by a temporary improvement, and then the whole performance *da capo*. The medical officer of health, finding the sanitary authorities with which he is connected irritated by these frequent complaints, and powerless to compel strict obedience amongst gentlemen who are often disposed to resign *en masse* these appointments, on account of the paltry pittance, facetiously termed remuneration, attached to them, ceases at length to indulge in a continual grumble, as no permanent good seems to spring from this privilege of an Englishman.

Even if the medical relief lists were as accurate as could be desired, they only give information as to the sickness of paupers.

3. *Why should this worthless mode of registering sickness be longer perpetuated?*—No good reason, so far as I know, exists for the continuance of this caricature of what is essential. The truth is, however, that the establishment of a complete system of registering sickness, analogous to that for recording births and deaths, would involve an interference with the liberty of the average Briton for which that freedom-at-any-price-loving individual does not at present see the necessity, and which he would consequently resist. As local self-government with a minimum of central interference is supposed to be the perfection of all human forms of government, and as some distinguished wiseacres, whose disciples among a certain class of ratepayers are very numerous, fear lest the priestcraft of past times should give place to a doctor-ridden condition which is equally mischievous, it is requisite, if fresh coercive and compulsory measures are to be obtained for the protection of the people, that the public themselves should demand them of the Legislature.

A Government cannot safely or wisely advance too far ahead of public opinion, but in order to be of service must lead, direct and guide it.

Unfortunately, no scheme has yet or ever can be devised for preventing one man from injuring his neighbour which does not involve some deterring or compelling influence. The instinct of self-preservation is too strong in human nature and the strain of competition is in these days too severe to allow of the establishment of that Utopian condition of society in which those least endowed with worldly goods will be found to plunge themselves, and others relyingly on them for support, into difficulties, for the sake of contributing to the public good.

It is well known that at Manchester the local medical men have, in a public spirited manner, made weekly returns for some years past of cases of sickness, and that a committee of the British Medical Association has more than once reported on the compulsory registration of disease. The legal powers that have up to the present time been acquired for obtaining a registration of sickness, are purely local in operation, being contained in section 87 of the Bolton Improvement Act of 1877, and in clause 202 of the Greenock Police Act of 1877. In the former, the registration of infectious disease is made compulsory on the person in charge of the sick, and on the medical attendant, and, in default, a penalty not exceeding 10*l*. In the latter, the Board has acquired the power to demand from householders, when epidemic disease is prevalent, a report of all cases of such disease, and to fine any one who fails to comply with such order a sum not exceeding 1*l*. All these efforts deal solely with infectious diseases; in fact, with a part only of a question of great magnitude. Is it not of almost as great importance to obtain a better knowledge of the home and distribution of such deadly diseases as consumption, cancer, etc.?

The consideration of the establishment of an efficient system of registering disease amongst all classes of the community is one of great moment, which involves an inquiry into a very large subject, including as offshoots details that would best be dealt with by a Royal Commission. The importance of the matter cannot be overrated. Of what use is it to make sanitary laws and to institute an elaborate system for the prevention of the spread of infectious disease, when the very foundation of the whole structure is faulty? Typhoid fever, for example, is fatal in about 10 or 12 per cent. of those attacked, and the great aim of an efficient sanitary organisation should be to provide the medical officer of health with prompt information of the occurrence of the first case, in order that he may take measures to prevent a second or a third. Under present arrangements nine or ten or more cases of this fever may occur amongst non-pauper patients before notice of the outbreak reaches him through the registrar of deaths. The proposal to call upon a struggling tradesman to voluntarily inform the public that fever is raging in his house, and to require him to temporarily close his shop for the public good, without granting him some compensation out of the funds of the public, namely, the rates, whom he thus benefits, is thoroughly impracticable. There can, I presume, be no question, in the mind of anyone who has taken an interest in sanitary subjects but that scarlet fever poison is disseminated by letters, for proofs of this accident have been repeatedly afforded. The outbreak of this disease in a village post-office has presented itself to my notice on two occasions, and in both cases the disease has spread. If a village post-office is temporarily closed on account of the presence within it of a virulent form of infectious or contagious disease, how is the transmission and delivery of letters to be in the interim provided for? Such are one or two instances of the difficulties belonging to the project, which can, however, be easily overcome, if the wish to surmount them exists. An exhaustive investigation of this very comprehensive subject of the registration of disease amongst all classes in all its bearings by a Commission empowered to take evidence is urgently required; but if this great desideratum is to be obtained, the demand for it must, as I said before and now say again, come from the public.

MR. BAILEY DENTON, in a letter which has been published, does not think it possible to prescribe with safety the sort of jointing material to be used for soil-pipes descending inside a dwelling, for he thinks such an arrangement altogether wrong. All soil-pipes from W.C.'s should be, said he, conducted to the outside and down the outside wall in the most direct way to the sewer, and ventilated by a continuation of the pipes to a height above all windows. He adds that nothing can be more liable to defect than putty daubed with paint; and if the joints are inside the house, it is a long time before defects are discovered, particularly when the pipe is cased with boards.

THE

SANITARY RECORD.

FRIDAY, DECEMBER 28, 1877.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

ANOTHER MOVE IN THE CAMPAIGN AGAINST INFECTIOUS DISEASE.

IT is very satisfactory to find that there is a strong and growing conviction forming amongst sanitary authorities as to the inadequacy of the means which the law at present places at their disposal for the arrest of infectious disease. Evidence is continually reaching us that these bodies are becoming alive to the fact that the official machinery with which the Public Health Act of 1872 has provided them is largely crippled in its usefulness in this important department of its work for want of the means of enforcing the precautions which our knowledge on this subject dictates. We have had occasion from time to time to lay before our readers copies of resolutions adopted by various local authorities in this sense, as well as to record experimental efforts in different directions which have been made by some of the more enterprising amongst them under the advice of their medical officers of health, with the view of supplementing by their own individual operations the defective provisions of the law. We have now to chronicle what we believe to be a new departure in this quest, which has been made by the Okehampton Rural Sanitary Authority. It appears that scarlet fever has found its way into a portion of the district over which the Board preside, and that the Board have done their best to advise the inhabitants as to the precautions which they should adopt, and at the same time to warn them as to the penalties which they incur if they neglect to adopt these precautions. As is too often the case, however, there is good reason for believing that the thunder of the Board is set at nought with impunity, for the simple reason that there is no machinery for promoting information when violation of the law occurs, and that there is no sufficient inducement to lead those who are aware of such violations to come forward with the evidence which is necessary in order to obtain a conviction. In view of these facts, the Board have adopted a resolution offering a reward to anyone who will give such evidence, and asking the assistance of the police in carrying out this object. In supporting this proposal, Dr. Blythe, the medical officer of health for the district, stated that in Dulverton there had been some reckless exposure a little time ago; but that a conviction which he had obtained had had good effect in checking it. According to his experience, scarlet fever was mainly spread by persons who had been in more or less intimate and constant contact with the sick, especially as nurses, going amongst the public with their infected clothes, without having taken any precautions in the way of disinfection. As an illustration of the usefulness of obtaining the co-operation of the police, he mentioned a case in which a policeman had undertaken to watch a house, in which scarlet fever existed, and so long as he did this the disease made no way; but as the sanitary authority did not think fit to give him any gratuiy for his services, he discontinued them, and directly he did so the fever spread. The course which the Okehampton Board have adopted is, we think, an indispensable step in rendering effective the very inadequate machinery which is at present at their disposal for arresting the diffusion of infectious disease, and other Boards would do well to follow their example. Until the public see that sanitary authorities are really in earnest in their determination to prevent the spread of these diseases, and to punish wilful neglect of those precautions which are within the scope of everyone, it is scarcely to be expected that they will trouble themselves much in the matter.

THE TREATMENT OF LUNATICS.

DURING the agitation in behalf of the Penge murderers, we took occasion to direct public attention to the deaths of two pauper lunatics in a Northamptonshire Asylum, under circumstances curiously similar to the death of the unfortunate Mrs. Staunton. We could hardly say they were murdered in the strict legal sense of the term, but if the statements published concerning their deaths were true, and there was strong *primâ facie* evidence that they were true, an inquiry as strict and as searching as that held in the Penge case was imperatively demanded. As at that time our modern knight-errant or Don Quixote, Mr. Charles Reade, was busily engaged in attacking the Penge Windmills, with the best of intentions we suggested that these Northamptonshire deaths were cases worthier of his knightly lance. However, the wrongs of poor Mrs. Staunton have met with retribution, but the wrongs of these dead lunatics still cry for vengeance, and we would again urge on the Commissioners of Lunacy the propriety of considering what better precautions than those now in vogue can be taken for the protection of lunatics from neglect or violence or both. We do this all the more urgently because only last week an inquest was held on an inmate of an asylum whose death was caused, or at least accelerated, by broken ribs, fractured, nobody knew how and nobody would tell by whom.

Broken ribs is a favourite injury in lunatic

asylums, and with a little trouble we could hunt up case upon case in which such accidents or miracles, as the keepers of asylums would term them, have occurred. The astonishing thing is, that how fractures occur in an asylum generally remains unknown. An ordinary policeman could enlighten the jury. It is well known amongst policeman that when they close with a refractory subject the battle is over if they can only fall on him properly—that is with their knees and full weight on his chest. Without doubt this is the secret as to fractured ribs in asylums. The patients are refractory, often violent, and their keepers try a fall with them as a result of which quiet is induced by loss of wind and fractured ribs. Fractured ribs tell no outside tale, and it is only on a *post mortem* examination that the truth leaks out, too late for the poor wretch who has been knelt upon, and too late for evidence to convict the cruel inflictor of the injury.

It has been urged that the bones of lunatics are naturally more brittle than those of sane persons. This is sheer nonsense, and while it is remarkable that fracture of the ribs or sternum is *par excellence* the lunatic fracture, these bones are those which it is next to impossible for a lunatic to fracture for himself.

Lunatics will occasionally be refractory and violent, but that is no excuse for violence in return. Lunatics will also be helpless and troublesome, but helplessness is no excuse for lice, nor is troublesomeness a valid excuse for bed-sores and protruding bones, and death accelerated from any of these causes becomes if not murder at least manslaughter. It hardly lies within our province to suggest a remedy; we plead for inquiry. Here within a short time three lunatics have met their deaths under circumstances which demand searching inquiry. In the last case, a lunatic dies, and a *post mortem* reveals fractured ribs, in the two former cases* two poor men died riddled with bed-sores, emaciated, filthy and lousy. That such cases should be possible in asylums, public or private, is a cruel scandal on our boasted civilisation.

We will make one slight suggestion, and it is that the licenses to keep an asylum should, like publicans' licenses, be liable to endorsement, and that they should be forfeited on the second endorsement. At all events, a lunatic is worthy of the same protection we afford to ordinary individuals.

If a dead body had been discovered on Waterloo Bridge with fractured ribs, there would be a hue and cry raised throughout the land. Bodies so mangled have been of late frequently found in lunatic asylums, and the matter, after a little local pretence at inquiry, has been stifled up. This is a matter which interests us all, for with our existing laws any one of us may be locked up as mad. At all events, let us ensure kindly treatment while in durance vile.

* See SANITARY RECORD, Sept. 14, 1877, p. 169.

Notes of the Week.

A MEETING of owners and ratepayers was held at Ruby Street Hall, Saltburn-by-the-Sea, on Thursday the 13th instant, and the following resolution passed: 'That "The Public Health Act, 1875" be adopted in the District Chapelry of Emmanuel, Saltburn-by-the-Sea.'

THE Local Government Board have informed the owners and ratepayers of Stone, Staffordshire, in answer to the resolution passed by them in favour of constituting it a Local Government District, that a local inquiry shall be held upon the subject, as soon as arrangements can be made.

THE Silicated Carbon Filter Company, Battersea, have lately received instructions from the Schools Board managers to fit up their main supply filters in several of the existing board schools, and most of the new buildings in course of erection will also be furnished with these very necessary appliances, which are so arranged as to ensure the perfect purification of all the water used. The Orphanage at Woodside, Croydon, recently instituted by the Rev. A. Tooth, has also adopted this mode of filtration.

THE METROPOLITAN WATER-SUPPLY.

AT the meeting of the Wandsworth District Board of Works on the 19th inst. the following report of a committee formed to consider the new scheme by Sir J. W. Bazalgette to sink artesian wells was passed *nem. con.*: 'Your committee have carefully considered the proposed scheme of Sir J. W. Bazalgette and Messrs. Bramwell and Easton for an additional water-supply for the metropolis, and are of opinion that such scheme is altogether premature. At the same time the committee would recommend that the Board approve the scheme of the Metropolitan Board of Works for purchasing the water companies, but they are of opinion that the result of such purchase should be practically tried before any such speculative scheme as before referred to is adopted. A large additional supply of water could, no doubt, be obtained from the Thames, the condition of which might be much improved, and at the same time arrangements might be made for delivering a continuous supply of water to the consumers direct from the mains.'

MONSTER RESIDENCES IN FLATS.

UNDER the above heading we ventured in our issue of August 10 last, to question the propriety of erecting such huge structures as the Queen Anne's Gate Mansions, and suggested several precautions which ought to be taken. We now learn without surprise that Mr. H. A. Hankey was charged at Westminster Police-court on Tuesday with having constructed a building of a greater area than three thousand square feet; with having run up his structure to a height of one hundred and forty-seven feet ten inches, whereas the maximum altitude to which he had been permitted to build was one hundred and forty-one feet; with having omitted to close the openings in his party walls by unwrought iron doors of a certain specified thickness; and with having constructed his floors of other than fireproof and incombustible materials—all in contravention of the Act of 1855.

We must all feel very sorry that this was not found out before the vast pile was raised, and we trust that the argument of the counsel will stand, that they had been laid in concrete; but that, such a substance being somewhat cold and uncomfortable to walk upon, the concrete basis had been covered by a layer of wood, which was not more combustible than carpets or kamptulicon. It is not an encouraging matter to know that our enterprising fellow-citizens are so hedged about before and after the realisation of their ideas as to give one an impression that the

acts and by-laws really operate as a premium upon standing still, and as a warning against innovations which are improvements.

WASTE PIPES OF CISTERNS AND SEWER GAS.

OWING to the occurrence of several cases of fever in a certain road in a north-western suburb a representation of facts in reference to the outbreaks of disease, extending over some five or six years, was made to the sanitary authority. Some common cause had evidently operated in the production of the outbreaks which had occurred at irregular intervals, generally commencing with typhoid and after the lapse of a few weeks giving place to scarlet fever. On making a careful examination of the houses it was found that the cisterns were in several instances in a dangerous position, beneath the floor of the closet, but in every case direct communication existed between the drain and waste-pipe of the cistern. An order to disconnect the waste-pipes having been given, it remains for time to prove how far the absorption of sewer gas by the water has acted as a fact or in the production of the maladies. It also becomes a question whether the owner of the houses ought not in common fairness to his unfortunate householders, who have suffered but recovered, to be called upon to reimburse them for the expense to which they have been put owing to his culpable negligence. Our official readers have no doubt met with many similar cases, but we cannot too strongly urge them to exercise a constant vigilance in reference to this imperfection in sanitary arrangements, which has so long flourished, but is now provided for by a clause in a recent Act on water-supply.

WATER-PROOF WALLS.

WE learn that the experiments lately made in Paris, by Professors Marcker and Berthold, as to the passage of gases through certain building materials, have come to the conclusion that bricks, sandstone and tufa, mortar and cement, when not kept under water, permit vapours to pass through them very freely, while granite, porphyry, slate, limestone, marble and alabaster are impermeable. As in many countries the dwellings are constructed principally of brick or of sandstone, according to the nature of the strata in the district from which stone can be procured, and cellar floors are almost invariably laid with brick, or unglazed tiles, which are the same thing, and frequently cement, it is clear that a vast number of persons reside in places which afford them no protection from injurious effluvia. We quite agree with our contemporary, and would again warn our readers that nothing but impervious materials are suited for the water-proofing of foundations of buildings or for basement floors. When concrete is used it should be coated over with some such paint as silicate paint, and the passage of the ground-air upwards rendered impossible. Professor Pettenkofer's experiments settled all this some years ago, but the facts elicited have not yet obtained entire credence or universal publicity.

The article goes on to state that where porous walls are objected to that the inconvenience or danger may be lessened to a considerable extent, even with those pervious walls. Thin paper-hangings, for instance, reduce the penetrability of mortar 17 per cent., and thick glazed paper 40 per cent.—white-washing and lime-whiting not at all. But a double coating of oil-paint renders them absolutely impassable to any deleterious emanations. Here it must be borne in mind, again, that impervious walls are unfitted for habitation. The vapour from breathing and cooking would simply run down them, and there would be none of that healthy interchange of air between the interior air and the exterior atmosphere. The ground-air should be kept from entering the cellar floors and filling the house with irrespirable air, but there should be a certain air-cellage in the structural walls above the foundations.

THE FALL OF THE HOUSE IN EDINBURGH.

WE have not often an example of the extreme danger which is liable to result from allowing people to remain in structures which have been partly gutted by fire, and the top portions of which are abnormally weighted, owing to the wholesale saturation caused by the supply of water intended to overcome the fire. The distressing case at Leith Walk in the Scottish capital is, however, a dreadful example of the kind, and it is with some surprise that one finds the people were allowed, under the circumstances, to remain in the building. The facts are as follows: The house, although presenting a front of four stories to the street, was built up from low ground behind, and at the back was eight stories high in all. The fire originated in the attic, which was used as a laundry. After the two upper stories had been destroyed the fire was extinguished, and the fire brigade withdrew. The joists of the upper floor had, however, been weakened by the fire; and the *débris* from the roof as well as the accumulation of water had the effect of carrying away this floor. This happened some time after the firemen had left, and when a number of poor persons occupying houses of one or two rooms on the sunk floors of the high building had gone to bed. The result of the seventh floor falling in was that all the floors below down to the basement were carried away, burying fourteen persons in the ruins. The front of the building remained intact, as did also one half of the rear, the fall being only through a portion of the latter. The hotel and the shops on the main street level were unoccupied at the time. The houses below were inhabited, however. Fourteen people in all were buried in the ruins, but some of them were rescued by the returning fire brigade.

We are told that the chasm made by the fall measured about 20 feet square, and from the bottom it presented the aspect of a shaft about 100 feet deep, on the several stages of which seven grates could be counted, indicating the number of floors carried away, while articles of clothing hanging on the walls were to be seen in each room. We wonder whether photography is brought to the help of our public services, and if the view of such a catastrophe is preserved upon paper for distant and even unborn generations of firemen. Were our fire-brigade offices hung with these pictures, and the lessons to be derived therefrom inscribed underneath, there would surely some benefit accrue. At all events the Leith Walk photograph would point out the danger of allowing persons to continue residence in an overweighted many-storied building.

SEWAGE PRECIPITATION AT STOKE-ON-TRENT WORKHOUSE.

THE workhouse at Stoke is situated at Newcastle-under-Lyme, and stands on a considerable elevation over the main road, accommodating some 600 inmates. The sewage works, which we are enabled to describe, are only some 250 yards from the buildings, and consist of two tanks, holding 6,000 gallons. Although very near the public road, moreover, they have never been known to cause a nuisance. The system in use is precipitation, and the purification of the sewage costs on an average 3*d.* per 1,000 gallons. The system at Stoke is to deal with one full tank with one charge of chemicals, and in about an hour the effluent may be run off, and is remarkably bright and clear. The excrement from 600 inmates of the workhouse is conducted into these tanks by means of water-closets, and this matter becomes diluted with water from the laundry, kitchen, stables, and piggeries. If we estimate the excreta from these 600 inmates of all ages, and remember that the average daily quantity which each individual passes is about 2½ ounces of fæces and forty ounces or one quart of urine, we shall find that the Stoke tanks receive every day about 93 lbs. of solid fæcal matter and 150 gallons of urine, and this is diluted with all the liquid refuse of the establishment.

We are informed by the medical officer of health that the sewage from this workhouse was originally conducted

into the canal close by, without any attempt at purification, but that the guardians were compelled to adopt some system of purification. An attempt was made to filter the sewage through beds of charcoal, but this had to be abandoned in consequence of the charcoal becoming gradually choked up, and its filtering capacity altogether gone. Under these circumstances recourse was had to 'precipitation,' and the results have been satisfactory on the whole.

The chemicals consist of sulphates of aluminia and iron, chloroxide of calcium, and a small quantity of powdered charcoal; none of these ingredients are expensive, and this is not the least commendable part of the system. When all is ready the chemicals are put into the tank, and the contents well mixed up by an iron mixer worked by two men. In less than a quarter of an hour the sewage at the top of the tank began to get clearer and clearer, and what a few minutes before was thick, sludgy liquid, is soon as bright and transparent as good drinking water. There could be no doubt about the change the chemicals effect, and even when tasted the water is found free from foul matter. In about an hour the whole process is complete, and while subsidence is going on no attention or supervision is required. About ten minutes' labour is all that is necessary. The effluent water is made to pass over a fine charcoal bed, and then it finds its way into the canal below.

THE LATE DR. TRENCH.

DR. W. S. TRENCH, the late medical officer of health for Liverpool, was born in Jamaica, and came, early in life, to this country to be educated. He subsequently entered the University of Edinburgh, where he graduated as M.D. in 1831, and in the same year became L.R.C.S. Edin. In addition to his medical training when passing through the University, Dr. Trench exhibited considerable proficiency both in mathematics and classics, the former of which he subsequently found of great service when medical officer of health. On the completion of his academical career, he returned to Jamaica, and commenced practice in Kingston, which he continued for some time, acquiring a considerable reputation. The climate of Jamaica, however, not suiting him, he returned to England, and, soon after his arrival, establishing himself in Liverpool, he obtained a very lucrative practice. In 1862, on the death of Dr. Duncan, Dr. Trench was elected medical officer of health for the borough of Liverpool. The year of his appointment was that one known as the 'cotton famine' period. The distress produced among the Liverpool dock-labourers was aggravated by the influx into the port of large numbers of men in search of work. The lower parts of the town became densely crowded, and typhus fever raged with great violence. Under Dr. Trench's direction, steps were taken which fortunately tended to the decrease of the epidemic. In 1866, the town was visited by another epidemic of typhus, followed shortly afterwards by a visitation of cholera. The steamer *Helvetia* arriving in Liverpool with cholera on board, Dr. Trench insisted on the vessel being removed to the quarantine portion of the river, and the transferring of the passengers to a hospital-ship.

The following are some of the improvements which occurred under Dr. Trench's directions: 1. The removal of middens and the substitution of water-closets; 2. The removal of tunnel-middens, which ran under the houses, and were frequently not emptied for years; 3. The registering of sublet lodging-houses, so as to prevent overcrowding; 4. Extending house-to-house visitation by sanitary inspectors; 5. The establishment of houses for the disinfection of clothing, and the disinfecting of houses in which fever had occurred. Besides these may be noticed the total abolition of cesspools; the prevention of the establishment of noxious manufactures in the vicinity of inhabited houses; the almost total prevention of intra-mural interments; the erection of abattoirs under local control; the widening of streets, and the erection of baths, washhouses, etc.

For upwards of a year and a-half Dr. Trench had been suffering from heart disease. On the evening of Wednesday, December 5, he retired to his bedroom about ten o'clock, when he became faint, and, sitting in his chair, at once expired. As a mark of the respect in which he was held, all the daily papers in Liverpool had leading articles expressing the greatest regret at the loss the town had sustained in his death. The flags at the Town Hall and Medical Institution were hoisted half-mast high, and his funeral was attended by the Mayor (Mr. A. B. Forwood), several town councillors, professional friends, and corporate officials.

Special Reports.

THE SOCIETY OF MEDICAL OFFICERS OF HEALTH.

THE usual monthly meeting was held on the 21st inst.; Dr. Stevenson, president, in the chair. After the minutes had been read, a communication was read from the Scottish Corporation; also one from the Local Government Board, in reply to the resolutions forwarded to the president, *re* infectious diseases, promising to take them into consideration. Also a reply from the Metropolitan Board of Works, stating that their action as to cow-sheds had not yet been confirmed, and another respecting the resolutions passed at the last meeting of the medical officers of health as to the proposed by-laws for regulating drainage works and water-supply and apparatus. To the last named, the Board replied that the bill introduced by them was of a limited nature, and that they could not insert clauses likely to lead to much opposition. The place for holding the meetings was discussed, when it was resolved to meet for the future in the rooms of the Social Science Association. The report of the council on the communication from the Birmingham and Midland Association of Medical Officers of Health, as to the attendance in public elementary schools of children living in infected houses was considered and adopted, it being recommended that an allowance should be made to the school manager and masters for children kept away from school for this reason in the same manner as if they had attended regularly. The medical officer of health for Newcastle-on-Tyne, Dr. Armstrong, was elected an extra-metropolitan member, and Dr. Heron an associate. Dr. Dudfield then read some correspondence which he had had with the School Board as to notice from their superintendents and visitors respecting children attending their schools who are absent through infectious diseases, in which the Board recommended that the medical officers of health should place themselves in communication with their visitors. The meeting advised this action to be taken generally, and a form of notice, proposed to be adopted by the medical officers of health, to be forwarded to the Board.

Dr. James Edmunds then read his paper on 'Observations on 1,000 Consecutive Deaths within Seven Years after Insurance from the Experience of the Temperance and General Provident Institution, with a Comparison of the Deaths in the Temperance and General Sections.' He commenced by stating that 700 of the deaths occurred in 15,250 persons insured in the General Section during ten years, and 300 deaths amongst 8,615 persons insured in the Temperance Section in twelve years. It was necessary to take the longer period for the latter class to make up the 1,000 deaths, but Dr. Edmunds did not consider that this extension of the time affected the results, as fresh lives were constantly being added to the list. The years for this section were from 1866 to 1877 inclusive. He pointed out that only a small mortality should occur amongst healthy persons in the prime of life within seven years after an insurance was effected, but yet there was one death within seven years in each 21·8 persons amongst the

general, and one in each 28·7 persons in the temperance section. The temperance insurers, when admitted, gave bonds to refrain altogether from alcoholic drinks, but it was not stated whether they were admitted at lower rates. After giving the absolute number of deaths from various causes, he gave the following comparative table, showing the relative numbers of deaths from various diseases, supposing the number of insurers had been equal in both sections.

	General.	Temperance (*i.e.* total abstainers.)
Nervous diseases . .	108	70
Lung ,, . .	260	282
Heart ,, . .	47	52
Liver ,, . .	47	19
Kidney ,, . .	22	16
Dropsy	9	7
Cancer	16	14
Stomach, diseases of .	13	9
Gastritis, etc. . . .	5	0
Delirium tremens . .	15	0
Atrophy, anæmia, abscess	7	0
Casualties . . .	39	46
Zymotics	54	82

Dr. Edwards, after reading these numbers, pointed out that the mortality amongst the general section was considerably in excess from nervous diseases, liver affections, and kidney diseases, whilst there was an excess amongst the insurers in the temperance section from lung diseases, heart affections, casualties, and especially from zymotic diseases. He considered these differences, especially amongst the latter as somewhat unexpected.

After a vote of thanks had been given Dr. Bate said he thought that errors had occurred in the registration of both classes. Mr. Price Jones of Surbiton expressed a similar opinion as he looked upon certificates of death as at present given to be scarcely reliable for the purposes for which they are used. Dr. Tripe considered there must be errors, as he could not understand why total abstainers should be more subject to accidents than those who indulged in alcoholic drinks or to a greater mortality from zymotic diseases and affections of the lungs. This remark applied especially to phthisis, unless alcohol be a true food which is readily oxidisable. A gentleman from the office explained that the total abstainers are younger men as a rule than the others, and might therefore have suffered in a greater ratio from phthisis which attacks them more frequently than persons of more advanced age; also that more abstainers were sailors, several of whom had been drowned. Dr. Stevenson made some remarks on these points, especially as regards the explanations just given. Dr. Bristowe considered the tables scarcely trustworthy, as the returns of deaths were evidently loosely given. He pointed out especially the proportion of deaths from delirium tremens, which were enormously in excess of the returns amongst an unselected population. He thought the examining medical officers or the insurers were not to be blamed for deaths from phthisis or aneurism occurring comparatively soon after insurance, as these diseases, especially the latter, could not always be detected in an early stage. Dr. Dudfield thought the ages at death should have been mentioned as well as the causes, which he thought were very loosely given to this office. He strongly contested the validity of the certificates as regards delirium tremens as being enormously in excess. Dr. Edmunds in reply said that there was often a difficulty, especially amongst country practitioners, in obtaining more definite certificates than those given. That as regards the mortality amongst the total abstainers, he considered it higher than it would have been as many were damaged by drink when they became abstainers, and again referred to the proportionately small number of deaths from nervous diseases amongst the abstainers, but admitted that two cases of meningitis had been placed amongst the deaths from delirium tremens, as meningitis was much the rarest of the two.

THE WATER-SUPPLY OF THE METROPOLIS.

THE following extracts from the annual report of the Local Government Board, containing the yearly reports of Major Frank Bolton, the water examiner, in reference to the water-supply of the Metropolis, are important at the present time, when there is an agitation with the object of the Metropolitan Board acquiring all the waterworks in their district:

The Kent Waterworks Company.—6,900 houses have a constant supply; 966 additional hydrants have been erected, making a total of 1,096. One additional engine has been erected.

The New River Company.—2,422 houses have a constant supply; 2,631 hydrants are fixed. New filter-beds at Hornsey were completed.

The East London Company.—60,870 houses have a constant supply, being about 55 per cent. of the total number supplied.

The Southwark and Vauxhall Company.—This company does not give a constant supply to any houses; the filter-beds are insufficient; the new reservoirs at Nunhead are in such an imperfect condition that they cannot be safely charged, and therefore, although most urgently needed, they have not been brought into use.

The West Middlesex Company.—Nearly 700 houses were added to the constant supply system during the last year, and a new filter-bed was added at Barnes.

The Grand Junction Company.—This does not at present give a constant supply to any part of its district. The company are contemplating providing additional reservoirs, which are much required.

The Lambeth Company are gradually extending the constant supply. The new reservoir at Norwood is nearly completed. The present capacity of the filter-beds is considerably insufficient.

The Chelsea Company give a constant supply to only about 100 houses. New works at Moulsey are proceeding.

The water examiner considers that the rate of filtration of the water-supply should not exceed 2½ gallons per square foot per hour, but this rate is exceeded in the case of the Lambeth Company, who filter at the rate of 3¼ gallons per square foot per hour.

It also appears that the total certified expenditure of the companies which supply the metropolis with water had, up to the end of the year 1876, amounted to a sum of more than 11,556,000*l.*; the average consumption had amounted to 118,728,718 gallons per day, or an average of 31¾ gallons per head of the estimated population. The total length of mains constantly charged and on wh ch hydrants could be fixed amounted to 668½ miles, while the total number of hydrants erected thereon was only 4,227.

It appears that the Southwark, Grand Junction, Lambeth, and Chelsea companies delivered turbid water upon several occasions, which the examiner attributes to the fact that the works of all those companies were undergoing important alterations and extensions. This seems a terribly lame excuse for supplying some millions of people with turbid water.

PARLIAMENTARY NOTICES FOR PROVINCIAL WATER BILLS.

AMONG the parliamentary notices which have been lodged for private bills during the coming Session are the following:

The Bangor Local Board of Health for the purchase by the board of the Bangor Water and Gas Companies undertaking. We published a report on the water-supply of this place on October 19 last; it showed that the supply was of a generally satisfactory character.

The Exeter Corporation apply for special powers to purchase the undertakings of the Exeter Water Company and the Dartmoor and Exeter Water Supply Company.

The Dartmoor and Exeter Water Company for the dissolution of the Dartmoor and Exeter Water Supply Company, Limited, and the incorporation of a new company.

We published a special report on the Exeter water-supply on November 16 last. It showed that although the average chemical results were only second-class, the water contained decomposing animal matter, and was not suitable for the supply of such a town.

The Deal Company apply for certain further powers. A report on this water was published in our issue of September 14.

The Scarborough Corporation apply for compulsory power to purchase the undertakings of the Scarborough Water Works Company and the Filey Water Works Company, to which we learn from other sources the Filey people very much object. A report on both these water supplies was published in our number for October 5. That of the Scarborough water showed that it was rather hard, but on the whole of a satisfactory kind, while the Filey water was badly filtered, of third-rate quality, and generally unsatisfactory.

The Scarborough Water Company also promote a bill for new works and extension of limits of supply.

The Southport Water Works Company apply to construct additional works. We published a report on this water on October 12, which showed that the water was of fairly good character.

The Weston-super-Mare authorities apply for leave to purchase the undertaking of the Weston-super-Mare Water Works Company. A report on this water was published in our number for November 30, and showed that the water was imperfectly filtered, contained a large proportion of salt, and was on the whole a bad second-class water.

The application of the Whitehaven Union appears to be for an entirely new company. We published a report on the water on October 5, and it showed that the supply at present furnished is constant except on Fridays, and except that it contained traces of earthy suspended matter, is one of great purity.

DR. J. A. RUSSELL ON WARMING AND VENTILATION.

THE second lecture to builders and plumbers under the auspices of the Royal Scottish Society of Arts was delivered last week by Dr. J. A. Russell to a large audience, composed mainly of masters and foremen, the ordinary artisan, though specially invited, not being proportionally so well represented. The lecturer first spoke of the composition of the atmosphere, and the effects of an increase or diminution of each of the constituents of the air in dwellings. The effects of breathing vitiated and pure air were contrasted by statistics and various data relating to the amount and temperature of air necessary for different purposes were given. Dr. Russell said that intellectual work demanded the purest air, and that ill-ventilated schools were a positive cruelty as well as an injury to health. It is when the vitality has been lowered, and the system poisoned by the impure air of an evening meeting that we are most in danger of inflammation due to the perverted action of the nervous system set up by the application of cold. He next passed on to practical methods of ventilating and warming, and considered the problem as affected by season of the year and temperature, fires, gas-lights, nature and aspect of walls, winds, etc., and criticised the special methods proposed by different inventors. The openings should be small and numerous, and should provide a sufficient supply without reckoning upon the porosity of the walls which in Edinburgh are practically speaking impervious. These lectures were illustrated by numerous diagrams and experiments, one of which proving the permeability of Portland cement by gases is very important. The discussion, which was led off by the Convener of the Health Committee (Councillor Gowans), Professor Fleming Jenkin, Dr. Macadam, and other scientific men and sanitary engineers, passed into the hands of the practical men, and became so interesting that it was adjourned to a special meeting, called for the 24th instant. The greatest credit is due to the Council of the Society of Arts for establishing the lecture,, and for throwing open their hall to the masters, clerks, and workmen in the trades concerned. In the latter it is most important to sow the seeds of real sanitary knowledge, for they do the work and have almost unlimited power of doing it right or wrong; whereas the public, however well they may be instructed, and however much they may desire to have their houses fitted up to the highest standard of sanitary excellence, are altogether in the hands of the architects who plan and the builders and plumbers who execute this work.

THE HEALTH OF WOMEN.

THIS was the subject of discussion at one of the 'At Homes' of the National Society for Women's Suffrage, held at the offices in Berners Street. It was introduced in an address by Miss F. P. Cobbe, and among the speakers were Miss Todd of Belfast, Miss Becker, Mrs. Hallet, Miss Bewick, Mrs. Rose, of America, Miss Jessie Boucherett, Miss Babb, and Mrs. Webster, and Mr. A. Arnold, and one or two other gentlemen. Miss Cobbe thought ladies were apt to incur slight risks thoughtlessly because they had none to look after them, as wives did after their husbands. She condemned, as practices which still survived, the neglect of exercise, the discouragement of appetite, and tight lacing; deprecated sentimental brooding over a 'disappointment'; and advocated healthy occupation for the mind as well as the body. In regard to attire, the address and the subsequent discussion may be described as a revolt against the tyranny of fashion, particularly in respect of the oppressiveness of false hair, the little protection afforded by bonnets, the great weight and inconvenient length of skirts, the lameness produced by high heels, and the difficulty of walking with the dress 'pulled back' by a modern device, the allusions to which seemed to be well understood. One or two ladies blamed men for professing that admiration which tempted women to submit to the vagaries of fashion. In a comparison between the attires of the sexes, the ordinary hat worn by the male voter was recognised as the symbol of his subjection to a corresponding yoke. Mention was made of the Mahommedan custom of covering the face as one very injurious to health, and it was said that Turkey's valiant defenders were mainly descended from races which discarded the yashmak and the thick veil. It was affirmed that much serious illness resulting from the neglect of early symptoms would be avoided if lady doctors could be more readily consulted. The discussion chiefly related to well-to-do women, but it was urged that for those in poor circumstances there was a great lack of healthy amusements, and that the co-operative principle might be usefully applied in furnishing them both with amusements and better food than they could now command. It was said that shopwomen suffered from standing too long behind the counter, but it was feared that anything like a demand for seats for them would lead to their being superseded by men. Mrs. William Grey, who had been moved into the chair at the commencement of the discussion, brought it to a close with a few earnest words on the aimlessness of too much education. She also urged that earnest, practical work would in many cases furnish the best specific against the ailments of women.

THE FILTRATION OF AIR.

AT the last meeting of the Manchester Literary and Philosophical Society, Dr. R. Angus Smith in the chair, Mr. William Thomson, F.R.S.E., read a paper 'On the Construction of a Room, or Series of Rooms, free from Germ Life, proposed for Use in the Performance of Surgical Operations.' The paper was illustrated by a model room and apparatus. Mr. Thomson said his object in bringing the paper before the society was to show what he considered to be a valuable application of a well-known principle—namely, that of filtering from the ordinary air the innumerable spores that are constantly found floating about in it, and so to arrange a room or series of rooms in which the air may be rendered optically pure. He de-

scribed a series of experiments by which he had succeeded in excluding fungus spores from a confined space or model room—the process being that of filtration through layers of cotton wool—and said that the results obtained showed conclusively that ordinary large rooms might be constructed and ventilated with filtered air by means of fans, so that flour paste, taken as a test standard, would remain in them free from fungus life. Such a room, or series of rooms, might be of great advantage in surgery, perhaps as a means of preventing spores from entering the wounds of patients, and so doing away with or lessening the onus put upon the antiseptic treatment, or in giving a better chance of success in serious surgical operations. The arrangements which he suggested on a large scale were a long room, or series of rooms, in a line at one end of which should be fitted a fan, behind a good filter of cotton wool, a long pipe, with a series of Bunsen burners set along it, so that when all were lit a line or sheet of flame would be produced, which might be gently passed along and made to play on every part of the floor, walls, and roof of the room, beginning near the end at which the fan worked and going gradually towards the door. By this means any spores adhering to the walls would be destroyed, and no air could pass back to pollute the walls or floor which had been thus purified. A stove might be arranged at the door end of the room, by which cotton garments to cover the ordinary clothes of the surgeons and attendants might be heated to a temperature presumably sufficient to destroy or paralyse the vitality of any spores that might have been adhering to them, where the knives and other appliances used might be previously heated under pressure. With such an arrangement at an hospital, it seemed to him one interesting mode of investigation into some most important subjects might be commenced.

Medical Officers' Reports.

ST. GEORGE, HANOVER SQUARE.—Dr. Corfield reports the gross number of deaths in the parish during 1877, to have been 1,868, but as 573 deaths occurred in public institutions and as the population of those that took place in all London was 362, the corrected number was 1,657, giving a death-rate of 18·2 per 1,000, the birth-rate being 23·88. The percentage of deaths under one year to registered births was 15·09, which is less than usual. The birth-rate in Hanover Square was 17·97, and the death-rate 17·97, whilst the birth-rate in Mayfair was 21·53 and the death-rate only 13·06, that of Belgravia being 19·46. The large proportion of servants in the parish necessarily reduces the death-rate below the average for all London, but the very low death-rate as compared with the birth-rate, seems to indicate that the deaths in public institutions have not been fairly distributed. Dr. Corfield does not publish his tables in the forms agreed to by the Society of Medical Officers of Health, which, as he is one of the secretaries, is to be regretted, but his Vestry are partly responsible for this, as they have not furnished him with the registrar's returns. He points out that he is thereby unable to carry out his duty as regards the prevention of infectious diseases, and presses again on the Vestry the necessity for their obtaining copies of the returns in the same way as almost all other vestries and boards have done. A large number of articles were disinfected, and nuisances removed during the year.

GLASGOW.—This report of the sanitary inspector contains the number of nuisances discovered and removed during the four years ending April 30, 1877, as well as of other sanitary works carried out, and is an interesting document, especially as the action taken in regard to infectious diseases is fully set out. The full sanitary staff consists of the medical officer of health, the sanitary inspector, thirty-six other inspectors, besides a female visitor, clerks, air analysts, food analysts, and a matron and servants at the house of reception. In the year ending April 30, 1877, there were 16,180 complaints received and 14,935 nuisances removed, being considerably in excess of the numbers for 1876; there were 18,079 lodging-houses examined, and 136,932 visits paid at night to detect over-crowding, resulting in 1,727 offences being discovered, and the fining or imprisonment of 573 lodging-house keepers. In 1874 there were 12,218 lodging-houses, so that their number has increased in the four years as much as 50 per cent., but the offences and convictions have diminished, as in 1874 there were 674 convictions against the 573 in 1877, and 1,547 offences discovered, so that the oversight has been attended with good results. The number of cases of epidemic infectious diseases varied each year rather considerably, as there were 6,060 cases in 1873-74; 8,077 in 1874-75; 6,750 in 1875-76; and 5,168 in 1876-77. There were 4,653 apartments fumigated in 1873-74. 6,217 in 1874-75, 5,300 in 1875-76, and 4,447 in 1876-77; the number of articles of clothing washed have, however, very much increased, as in 1873-74 there were 69,710, and in 1876-77 as many as 117,680. The number of infectious cases treated in hospitals varied very much, as in 1873-74 there were 2,585; in 1874-75 2,429; in 1875-76 1,675; and in 1876-77 only 1,039. The cases treated at home were, in 1873-74 2,585; in 1874-75 5,648; in 1875-76 5,075; and in 1876-77, 4,129. As the number of small-pox and scarlatina cases was largest in the two first years, we suppose a larger proportion of these than of the fever cases were removed to the hospital. The amount of sanitary work done in the year was very large, but scarcely commensurate with the size of the staff, when we compare the work done in large London districts, although certainly the night inspection of lodging-houses is not carried out here, except by the police who are specially employed for the oversight of common lodging-houses. At any rate, the town council cannot be accused of parsimony in carrying out their sanitary powers.

Law Reports.

MILK ADULTERATIONS.

A. GARNHAM, milk-dealer, of St. George's Road, Camberwell, was summoned at the instance of the vestry of Camberwell for selling milk adulterated with water. The offence was proved by J. H. Stevenson, one of the sanitary inspectors, and it was shown that milk purchased at the defendant's shop was adulterated to the extent of 18 per cent. with added water. This was a second offence, and Mr. Chance now imposed a fine of 30*s*., and 12*s*. 6*d*. costs.

T. Cox, milk-dealer, of Wells Street, Camberwell, was summoned for a like offence, and it was proved that milk purchased by the inspector was adulterated to the extent of 17 per cent. with water. This defendant had been previously convicted. He was now ordered to pay a fine of 2*l*., and 12*s*. 6*d*. costs.

E. RICHARDSON, a dealer in milk, 195, Southwark Bridge Road, was charged with selling milk adulterated with 30 per cent. of water. Edwards, an inspector, said that he purchased threepenny worth of milk of the defendant; and as soon as he got possession of it, he portioned it off into three bottles, and sealed them up, telling the defendant he intended to have it analysed. He left one bottle with her, one he took to the analyst, and the third he now produced. The milk had been analysed, and he handed in Dr. Muter's certificate showing that it had been adulterated with 30 per cent. with water. The defendant said she had not been in the business many weeks, and she sold the milk as she received it from Mr. Kirby, of the Renfrew Road, Kennington Lane. She was not aware that it was adulterated. As the defendant had only been

in the shop a few weeks, Mr. Benson fined her 5*s.* and 12*s.* 6*d.* costs, telling her that she could proceed against Mr. Kirby, if she liked.

EAST LONDON DWELLINGS.

MR. HUMPHREYS held an inquest at the Duke of Gloucester tavern, Mile End Old Town, concerning the death of an infant, aged five weeks. The case was a somewhat remarkable one, disclosing, as it did, the squalor and wretchedness in which the foreign poor dwell. The deceased was the offspring of parents natives of Poland, living at 54, Salford Street, the father gaining a livelihood by stick making. On Friday, the 23rd ult., the child was found dead, and the evidence proved that death was due to suffocation. As is usual in such cases where there is no positive evidence how suffocation arose, the jury returned an open verdict; but before the inquiry concluded, the attention of the Coroner was directed to the dilapidated state of the house in which the parents dwell, and it was suggested that the sanitary authorities ought to be communicated with. After some discussion, the Coroner promised to forward the recommendation of the jury to the local authority.

LOCAL BOARDS AND HIGHWAYS.

V.C. SIR R. MALINS has had before him the case of *Ashworth* v. *Hebden Bridge Local Board.* This was a motion to restrain the local board from levying a rate on Sarah Ashworth for the repair of a road until the plaintiff had time to state a special case to the Queen's Bench upon the question. The local board levied a rate on twenty-eight inhabitants to repair the road, and they resisted on the ground that it was a highway. A Mr. Lister was ordered by the justices to pay his share of the rate, and in default was threatened with a distress and imprisonment 'with hard labour.' Mr. Lister could then have had a case stated for the Queen's Bench, but owing to the technical error of the words 'hard labour' having been by mistake inserted in the order, he appealed to the Quarter Sessions, and the magistrates quashed the order. Miss Ashworth alleges that the local board had agreed with her that Lister's case should be a representative one; but Lister's case having fallen to the ground, the local board say that Miss Ashworth's time for stating a case has passed, and that they intend to levy. The Vice-Chancellor, considering that the justice of the case would be met by obtaining the opinion of the Queen's Bench as to the liability of Miss Ashworth to pay, ordered that, upon payment into court by her of 200*l.*, the amount of the rate claimed, the interim injunction already granted should be continued against the local board until the Queen's Bench had decided the main question.

AN EXPENSIVE DOG.

AT the Cheltenham County Court, *Barradaile* v. *Moon* has been tried. The plaintiff, a carpenter, on Sunday morning, September 16, was walking with his nephew down a street, where the defendant's premises are situated, when he saw the defendant's great big black dog lying in the street, near his master's gate, apparently asleep. The dog allowed him to pass quietly, but almost immediately after, without provocation, jumped and bit the plaintiff's leg, tearing his trousers, and inflicting a slight lacerated wound, the result of which was that he was unable to work for three weeks. For the defence, it was stated that, although the dog was kept at the house of the senior Moon, where the other defendant lived, it was his son's dog, and therefore the father was not liable. Also, that immediately after the dog flew at the plaintiff, Moon, jun., asked plaintiff what was the matter, who then said that the dog had torn his trousers, but had not hurt him. Plaintiff admitted that he had said so, but at that time he felt no pain. His honour said the law was that the person at whose house the dog was kept was its owner, and therefore the action must lie against the elder Moon, and not against the son. The bite in this instance was not a severe one, but the effects of a dog-bite lasted longer than a similar wound by a less venomous instrument, and it was very likely the plaintiff would suffer for years, if not for life. Judgment must be for the plaintiff for 5*l.* Defendants had paid 2*s.* 6*d.* into court.

BREACH OF THE FACTORY ACTS.

POWELL AND SONS, tanners, Spa Road, Bermondsey, were summoned by Mr. Redgrave, inspector of factories, for having unlawfully failed to hang up an abstract of the Factory Act, and the usual notices, at the entrance of the factory; also neglecting to register the names of those employed under eighteen years of age, and obtaining surgical certificates of other young persons. Mr. Redgrave said he had visited the defendants' factory several times, and found a number of lads employed there under the age of eighteen. There was no registry of their names, and the abstract of the Act of Parliament and notices required by the Act were not posted up at the entrance of the factory. He pointed out the illegality of this conduct, but as they neglected to conform to the Act of Parliament, he was compelled to take proceedings. Mr. Washington, for the defendants, said they were quite willing to comply with the Act. The lads were employed by the journeymen, and as soon as Mr. Redgrave complained of the non-compliance with the Factory Act they made inquiries, and asked that time should be given them up to the 21st, by which time they would get rid of the youths, as notice had been given them to leave. Mr. Partridge observed that defendants must have known the requirements of the Act, and should have posted the abstract and notices at the entrance of the premises. They ought also to have registered the youths, and it was absurd to say they now had given them notice to leave. He imposed a penalty of 3*l.* and the usual costs.

SUBSIDENCE OF HIGHWAYS.

THE Exchequer division has had before it the case of *The Benfieldside Local Board* v. *The Consett Iron Company.* —The question turned on the construction of an enclosure Act passed as far back as 1773, called the 'Lanchester Common Division Act,' whereby the Bishop of Durham was empowered to enclose some 20,000 acres of moor and common. The rights of the Bishop as lord of the manor have now passed to the Ecclesiastical Commissioners, who have leased the mines to the defendants. In consequence of the working of the mines certain highways have subsided, and damage has been done to the extent of some 30*l.*, which the plaintiffs seek to recover in this action. The plaintiffs contend that both on grounds of construction and of policy the public have a paramount right to have safe highways and free from pitfalls.—The Lord Chief Baron: The plaintiffs are entitled to our judgment. By the Act, certain roads are constituted and established for the use of the public at large. And, as it appears that the award of the Commissioners was made in 1781, it is probable they were made shortly after. There is likewise, as it were, a prohibition to make any other public roads, except where the lord of the manor may make ways, etc., for his mining purposes. The Commissioners thus had a duty to set out these high roads. The case finds that certain portions of these roads within the town had sunk, and become dangerous. The mere statement is surprising that there exists a power in the lord to interfere with a highway 60 ft. broad, that has been enjoyed by the public for from sixty to seventy years, and make it dangerous to traffic. No one contests his right to full exercise of his mining powers. But he must have the right of erecting fire-engines or workshops in the very centre of the road, if he possess the right to withdraw the natural supports. The plain answer to his claim is this,—His powers are subject to the express provisions of the Act, which say, that over part of these wastes or commons there shall be a highway for all the Queen's subjects. Anything incon-

sistent with the creating, preserving, and keeping in repair of these roads is beyond the powers of the lord, and an unlawful act. The case of *The Duke of Buccleuch* v. *Wakefield* does not apply. That did not relate to a highway at all, and the Enclosure Acts have been stretched by a large and liberal construction beyond their intention. That was the case where an individual would have been prejudiced in the exercise of his large powers. If rights such as the defendants claim were exercised, they would cause the highway to cease to exist, and I am clearly of opinion that paramount to the lord's right is the reservation of part of the waste into highways. Anything done so as to make the road less useful and beneficial to the ratepayers and the public is beyond his powers, where no such right is conferred. Baron Cleasby concurred. Judgment for the plaintiffs.

DRAINAGE RIGHTS.

THE Court of Appeal has had before it the case of *The Widnes Metal Company* v. *Norwood*. Judgment was given on the appeal from a decree of Vice-Chancellor Bacon, the effect of which was to restrain the defendants from constructing an embankment and other works upon the Marsh brook, a tidal stream flowing into the Mersey, so as to interfere with the drainage rights of the plaintiffs, who as lessees from the defendants, are tenants of large chemical works which drain into the Marsh brook, and are situated on a part of marsh land bounded by the Mersey. The defendants were about to make a dock with embankments and other works, which would have the effect of altering the course of the Marsh brook, and substituting for it a new channel, which in parts of its course would be a closed culvert through an embankment. Higher up the stream were other chemical works, of which the defendants were also the lessors; and from these works quantities of water loaded with chemical salts were discharged, the effect of which, especially when augmented by the large discharge from the plaintiffs' works, was to produce a considerable deposit, such as would very soon close up any covered channel, and, as the plaintiffs alleged, utterly destroy their drainage if a culvert were substituted for the open channel. Upon the original application for an injunction, the defendants undertook to keep the water course effectually scoured so as to prevent the deposit; and this, it appeared, had been successfully accomplished by sluices and flood-gates. The suit was brought to a hearing for the purpose of determining the legal rights of the parties, and the Vice-Chancellor decided for the plaintiffs upon all points. The defendants appealed. Lord Justice James, after stating that it was much to be regretted that the litigation was not terminated when, by the measures taken by the defendants, the plaintiffs had no longer any ground for complaint, said that, independently of the general words used in the lease to the plaintiffs, the grant itself of a piece of land, including part of a watercourse would give to the grantee the usual rights of a riverain proprietor, and no one would have a right to interfere with the watercourse either above or below to the injury of such proprietor. It was contended on the part of the defendants that the plaintiffs had not, either as such riverain proprietors or under the express words giving passage of water and soil, any right to pour water in such quantities and of such quality, as was done in this case. But the only limit to the natural and ordinary drainage of the country was that the person using this drainage channel should himself not use it so as to create a nuisance or otherwise to damage and injure his neighbours either above or below. Here it was impossible to hold that pouring 30,000 gallons a day of water impregnated with sulphate of sodium into a watercourse within the daily flux and reflux of the tide—pouring strong brine of one salt into a weak brine of another salt was in any sense of the word a nuisance or a damage or injury to the proprietor of the marsh. If there were no other work in the neighbourhood, the discharge would be perfectly innocuous, and it was not possible to hold that that which in itself was a perfectly legitimate use of a man's property had become illegal and a nuisance because his lessor and neighbour had chosen by himself or his subsequent grantees to pour other waters into the course and to deposit other materials on the adjoining land, by the combination and result of which that which was innocuous had been made to produce a harmful deposit. It was, moreover, not to be overlooked that so long as the Marsh brook remained open and accessible the deposit would be of very little consequence. What was not washed away either by the ordinary or extraordinary tides could probably have been got rid of by a little scraping. Their Lordships were of opinion that the plaintiffs were entitled to come to this Court to prevent what was about to be done to their very serious injury. Nor was that right in any way affected to the prejudice of the plaintiffs by the agreement entered into between the lessors and the several lessees for effecting separate drainage into the river. Their Lordships could not differ from the conclusion that the weight of evidence was in favour of the plaintiffs. It was no sufficient answer to say that the plaintiffs did not acknowledge their liability to pay. Payment was not a condition precedent; nor was it a condition precedent that they should give a fresh promise to pay or a fresh acknowledgment of their liability to pay. The fact that the defendants foresaw such a dispute as to the money demand was no justification or excuse for their interfering with the existing drainage facilities of the plaintiffs until they had provided a sufficient substitute for the same. The appeal must be dismissed, with costs.

Legal Notes and Queries.

HOUSE DRAINS.

SIR,—Will you excuse me laying my case before you, and give me your advice under the following circumstances?

There is in my yard, connected with my kitchen, a sewer into which the pipe carrying off all water from the slop stone in my back kitchen empties itself; into the same sewer a pipe is placed for conducting rain water from the roof. Either the sewer is not large enough, or what I think most likely, it requires to be opened and thoroughly cleansed (as the premises have been years unoccupied). In consequence, in wet weather the sewer overflows, and the yard is flooded, and stagnant water remains. I could not get my landlord to remedy the nuisance, so called in the inspector, who gave notice to have the sewer attended to. The steps the landlord has taken is to altogether stop up all communication connecting the pipe from the slop stone, so that now my servant has to carry every drop of slop and washing water in buckets all through my front kitchen down a long narrow passage and across the yard to empty her buckets into the said sewer, a distance of sixty yards.

Is it possible that I have no remedy, and that a landlord can thus act toward a tenant? Cannot the nuisance inspector require him to reopen our pipe and make the sewer sufficiently large to carry off the surplus water?

A SUBSCRIBER TO THE 'RECORD' FROM COMMENCEMENT.

[This letter does not contain sufficient material for us to give a full answer. What is the nature of the tenancy? Who repairs? What are the covenants? All we can suggest is that our correspondent should try and induce the inspector to serve a notice on the landlord. It is clear that to block up a drain altogether is not the proper way to remedy a nuisance arising from a drain being out of order for want of cleansing.—ED.]

HOUSES WITHOUT WATER-SUPPLY.

SIR,—Is there any record of a conviction being obtained against the owner of a house without water-supply, on the ground that it is a nuisance injurious to health?

As a medical officer of health I am prepared to condemn every house without water as unfit for habitation. I am advised I cannot sustain the complaint. Your opinion will oblige, M. O.

Dec. 17, 1877.

[No, and no wonder; for there is no Act which says that a house without water is a 'nuisance.' The only remedy in such case which a local authority can resort to is that provided in section 62 of the 'Public Health Act,' 1875.—ED.]

THE LONDON WATER COMPANIES.

'FAIR PLAY' writes: 'An application will be made by the Metropolitan Board of Works in the ensuing Session of Parliament for power to buy the property and rights of the companies that now supply the London district with water. The value of this property will be determined by the amount of the income that is now derived from it. It may be worth while, therefore, to inquire beforehand whether these companies have a legal right to the full extent of their claims. In the Acts by which they were incorporated, the highest rate allowed is 5 per cent. on the assessed value of the building which they supply. My house is assessed at 71*l.*, and the legal charge for water is, therefore, 3*l.* 11*s.*; but the actual charge is 5*l.* 4*s.*, or more than 7 per cent. on the assessed value. This sum I pay annually under protest, but I am obliged to pay it, for the companies have a monopoly of the supply, and I am not rich enough to enter into a contest with a powerful and wealthy corporation. It is of no use to appeal to the companies, for they decide, of course, in their own favour. They claim to have the right to make certain extra charges beyond the legal rate; but, if I am rightly informed, they have no such right in the case of a dwelling-house unconnected with any purposes of trade or manufacture.'

Correspondence.

All communications must bear the signature of the writer, not necessarily for publication.

WATER-SUPPLY AT SEASIDE WATERING-PLACES.

(*To the Editor of the* SANITARY RECORD.)

SIR,—The three letters you published last week from Messrs. Nicol, Smith, and Longstaff, are such fair criticisms on the analyses of the various waters I have reported on in my series of papers, that I reply to them with pleasure.

I will refer first to Dr. Nicols's letter as to the Llandudno water; he does not appear to question my figures or results at all, but only the inferences which I draw from them. I may therefore reply to the matter from this latter point of view only.

The most unfavourable of the results which I obtained from the Llandudno water were that the loss on ignition was nearly 10 grains per gallon, that the water when warmed had an offensive smell and taste, and that the microscopical appearance of the residue was extremely unsatisfactory. In commenting on these results I did not, as Dr. Nicol says, refer to the Llandudno water as being an *inferior* specimen of a third-class water, but I did say that the authorities were not moving in the matter any too soon, and in the summary published on November 9 last I also said that the water contained the largest amount of solid matter and salt contained in any of the public supplies then being summarised, and I classified it as third-rate water. The analyses made some twenty-five or more years ago by Messrs. Herepath and Muspratt are certainly not worth a moment's consideration now. If the water-supply of a town like Llandudno, much frequented by visitors, and having a resident population of some 3,000, is not analysed more than once in a quarter of a century, the purity of the water can hardly be considered as an assured fact. Dr. Nicol next questions the source from which my sample was drawn. In reference to this it is obvious that my assistants are to some extent at the mercy of the local authorities and residents at whose offices or houses the samples are obtained. The inquiries have been made, and the samples drawn in every case, *with the utmost care*, and they were so in this instance, and I have every reason to believe that the sample drawn by my assistant on September 1, at Llandudno, came direct from the mains. At any rate, I accept the responsibility for viewing it as a proper sample until Dr. Nicol or someone else is in a position to prove that the householder from whose house it was taken *wilfully* gave my assistant false information. If Dr. Nichol chooses to investigate the matter, I shall have great pleasure in giving him private information as to the place from which my sample was obtained, or if he chooses to personally draw another sample and send it to me, I will analyse it on the sole condition that the results are published in the SANITARY RECORD.

I pass now to the question of the discrepancies between Professor Wanklyn's analysis and my own. The first part of this analysis is evidently imperfectly copied, because as printed it does not state whether the ammonia and albuminoid ammonia are reported in parts per hundred thousand, per million, or per gallon. This is the more important, because Professor Wanklyn bases his conclusions mainly on these results. I have little doubt, however, that his statement is in parts per million. Calculating the albuminoid ammonia to grains per gallon, we shall get ·0014, a figure which is considerably under one-half the amount found in my sample; therefore, taking the actual figures obtained by Professor Wanklyn, of the correctness of which there cannot be any doubt, and granting that no other determinations were made except those set out in the printed statement of the report, my opinion on those figures would certainly have been favourable to the water, but I tested it in two or three other ways, which are not reported on by Professor Wanklyn; I, for instance, found that the water had a most offensive smell of decomposing vegetable matter, and that the results of the microscopical examination were extremely unsatisfactory, disclosing the presence of much suspended matter, consisting principally of animal *débris*.

Now these latter results, *i.e.* the physical and microscopical, are sufficient to class any water as of inferior quality, even if the chemical results were of a thoroughly satisfactory character. Dr. Nicol evidently takes a thorough interest in the purity and sufficiency of this supply. Cannot he add still more to his good work by finding out the source of this contamination?

Referring now to Mr. Smith's letter in reference to Torquay, he points out an error into which I fell in writing my report, where I stated that the water is *pumped*. I must have written this by a slip of the pen, as from my notes it appears that it gravitates. I must, however, take exception to almost all the rest of Mr. Smith's letter. As regards the sample drawn by my assistant from a main tap at the engine-house, and the results of the analysis of which Mr. Smith tabulates in his letter side by side with Dr. Frankland's and his own, the difference between the three analyses is sufficiently small to be entirely accounted for by the changes which may be expected to take place from time to time in a supply of this kind, and still more so by the changes which may have occurred between the years 1873, 1874, and 1877.

There is another point in connection with these three analyses which appears to me of serious importance. Dr. Frankland's analysis was made on a sample taken from Newton Abbott, Mr. Smith's on a sample taken at Tottiford, while mine was made on a sample taken from a main in the town, and I am quite convinced that the latter is the only truly reliable place from which to draw a sample for analysis. Contamination occurs much more

frequently than is ordinarily supposed in the mains leading from the reservoirs to the places supplied, and, although it is quite proper before a water-supply is laid on that the water proposed to be taken should be carefully analysed, yet when that supply is once in use any sample for analysis should be drawn from the mains, and not from the reservoir, and though I have always been glad to have a sample from a reservoir I have always taken one from a main as well.

Mr. Smith properly corrects in a foot note the error into which he was led by an incorrect copy of my report, but in consequence of this error he has reasoned on an erroneous basis, though nearly the whole of the paragraph in which it occurs, and his emphatic contradiction of what he supposed I had said is also entirely unnecessary.

The statement however, that the water from the Warberry reservoir sent me by Mr. Little, contained 19·50 grains of total solid matter per gallon is perfectly correct. I cannot help what Mr. Smith's opinion may be, but until he makes good his suggestion that an official, holding a responsible position, such as Mr. Little does, has deliberately played 'a very neat practical joke' upon me, I am content to let the matter rest, merely saying that I received the water from Mr. Little and reported the results which it gave. Mr. Little in his letter to me stated that the sample No. 1079 was water from the main as it flows into the Warberry reservoir, and the results of the analysis of that sample appeared in the SANITARY RECORD of December 7. Referring further to this sample, Mr. Little wrote 'there had been an exceptionally heavy rainfall, and the quantity of matter in suspension in the sample taken from the Warberry main was greatly in excess of that taken from the Chapel Hill reservoir; I noticed as I filled the jar that the water was far from being in its ordinary state of clearness,' and therefore when an official writes to me in this manner, any opinion adverse to his *bona fides* which Mr. Smith may entertain may properly be viewed with indifference both by Mr. Little and myself.

The question of deposit in the pipes, which is acknowledged on all hands to take place, is scarcely worth the discussion it has evoked; whether it is deposit or incrustation is drawing a line so fine that I confess I cannot see what is the practical difference in the meaning of the two words. Whether the pipes have to be scraped every three months, as my assistant was informed, or every six months as Mr. Smith alleges, or every twelve months, as the editor of one of the Torquay papers states, is also a matter of such extremely little moment that it may be dismissed from further consideration.

I certainly did not know that all the water delivered into Torquay came from the granite, and I may as well add that I am quite certain that the sample marked Warberry Reservoir, received from Mr. Little, which contained 19 grains of total solid matter per gallon and had 10° of hardness, did not come from the granite. Surely Mr. Smith himself must admit—indeed he has done so as I will presently show—that heavy rains are capable of altering the character of the water supply of Torquay by causing springs which are usually dry to become productive. Is it not possible that some of these springs run through a limestone stratum? the results certainly seem to indicate that this is so.

But what does all this outcry mean? Mr. Smith himself analysed this water in 1873, and his report, in the form of a pamphlet, is now before me. He there states that the water contained suspended matter, and that when microscopically examined 'under a low power, this suspended matter was seen to be composed of *débris* of leaves, wood-fibre, parenchyma, etc., and several minute diatoms were observed.' If this statement is compared with mine on page 358 of this journal, where I state that 'the microscope showed that the traces of suspended matter consisted almost entirely of decomposing leaves and vegetable fibre; and there is very little doubt but that the slightly objectionable smell which the water had may be traced to the same source,' the difference between the two statements is merely in the idiosyncrasies of each writer; but I cannot agree with Mr. Smith in his further statement that this is 'nothing more than is usually found in the purest unfiltered water.' On the contrary, I could show him some scores of samples of unfiltered water which do not contain any suspended matter at all. The foot-note, on page 11 of his pamphlet, still further confirms my report, for there Mr. Smith says, 'Occasionally, after heavy rains, the water is slightly discoloured by *peaty matters*, but without deleterious results.' Of course I accept his confirmation of my reason why the Warberry reservoir water contained so much solid matter, but I dissent entirely from the deduction he draws from it.

Briefly speaking, I do not consider the Torquay water is bad; but until it is proved to the contrary, I do consider that, as shown by the samples forwarded by Mr. Little, it is liable to very serious variations dependent upon rainfall.

Dr. Longstaff's letter deals more with the general principles upon which the results of my analyses are valued, and necessitates a somewhat more elaborate reply. It is quite possible that I should have done better if I had set out more fully than I did in the opening paper of the series, the data on which I work. Dr. Longstaff, however, has summarised part of the results in such an admirable manner, that I can perhaps occupy less space in my reply than I otherwise should have done. When the series is completed I shall send you a complete tabulated statement, which will, I doubt not, show in some cases even greater *apparent* discrepancies in certain individual results than those pointed out by Dr. Longstaff.

Replying to his letter I am quite convinced that an examination as elaborate as that which I make, is absolutely essential to enable a thoroughly reliable opinion to be formed upon the character of a drinking water. I am aware that my analyses are far more elaborate than those usually made, but the increased work involved in the extra determinations is, in my opinion, far more than repaid by the results obtained. I differ from most other analysts, as Dr. Longstaff points out, in placing more importance on the physical determinations than is generally given to them. As regards the microscopical examination, for instance, I am of opinion that no water which shows any distinctly recognisable traces of animal contamination should be passed higher than as a third-class water.

The method which Dr. Longstaff mentions of allowing a water to stand in a Mohr's burette, and then drawing it off from the bottom in drops, is about the best one that can be adopted for preparing the samples for the microscope; but the burette should be of unusually large diameter, so as to diminish the adhesion of the sedimentary matter to the sides, and it should be furnished with a stop-cock instead of the ordinary india-rubber tube and pinch-cock.

The colour of the water is a determination of great value—a very small amount of vegetable or animal contamination is often discovered by this test. The smell, if tested in the manner which I described in your number for November 30, is also a determination of very great value, as also is the taste, provided it is tested by a man who has had special experience in that class of work.

Replying now to the specific points in Dr. Longstaff's letter, I give a certain definite value in figures to each of the results I obtained in the course of a water analysis, and then add the whole of the figures thus obtained together, and from the total I decide whether the water belongs to first, second, or third class. I had not intended at present to publish the actual figures which I use, because, although they are the result of some years of work and consideration, I am quite aware that they are still open to corrections and amendment on some points, and the only thing which I claim for them in their present state, is that they do form a very good approximation to what I may call a numerical scale of estimating the purity of waters. The reason they are open to correction and amendment is, that it is quite possible for other analysts to materially differ

from me in the relative values to be attached, say for instance to the determinations of albuminoid ammonia, nitrates, and salt, and in the importance of the microscopical examination.

The scale I have adopted in calculating the results is not inaptly described in the last paragraph but two of Dr. Longstaff's letter. I look upon each unit of nitrogen as albuminoid ammonia as being ten times as bad as a unit of nitrogen as nitrates, twenty times as injurious as a unit of oxygen absorbed, and five times as injurious as a unit of nitrogen as nitrites. I then give to all the physical tests a certain definite value, ranging say from pale blue colour which I call 0, to full urine yellow which I class as 6, and I treat the taste, and smell, and microscopical appearance in the same way.

Now whether the results obtained by this arbitrary scale are strictly correct or not, there is, in my opinion, no doubt that they afford a means of judging of differences in the purity of waters much more accurately than they can be judged without the use of some such system. It is perfectly true, as Dr. Longstaff says, that I have sometimes condemned waters which contained a very low proportion of albuminoid ammonia, and even in addition to this a very low proportion of nitrogen in other forms, and which showed only a small loss on ignition; but in every case where this has been done it will be found that there is some other feature brought out either by the physical examination or by some of the other chemical results, which in my opinion is sufficient to justify the condemnation. Thus, for instance, I know that I put the sample of water from Walton-on-the-Naze, which contained only ·0024 grains per gallon of albuminoid ammonia into the third-class, but the reason is obvious—the water contained chlorine calculated as chloride of sodium nearly 183 grains per gallon—this is brine not water. Again I found the Sandwich Delf stream contained only ·0030 grains per gallon of nitrites, but the physical results gave me an objectionable taste and smell, and the microscope showed that the water was 'full of living organisms, some monads only but a large proportion of higher grades.' Here, then, again was ample evidence on which to condemn a water. In the case of Hythe also there was an excessive loss on ignition rather more than 8½ grains, and the nitrates were also higher than in a good many other waters, and yet I considered it as a first-class water because the colour was good, there was no suspended matter, I was not able to detect any organic impurity by means of the microscope, and the albuminoid ammonia was fairly low, and these good features were sufficient to neutralise the objectionable character shown by the excessive loss on ignition.

I feel persuaded that a fair consideration of this mode of valuing waters will eventually lead to its universal adoption. I do not say that my scale is in such a perfect condition that it will be *the scale* which will be adopted, but only that the system laid down is correct, and that the figures are approximately so.

I agree that it would have been better to have stated the hardness last, but it would be a great pity, having nearly completed the series with the analyses stated in their present form, to alter that form now.

The examinations of the colour, taste, smell, and with the microscope, have been made in every case; although it is quite correct, as Dr. Longstaff points out, that in a few instances they have not been specifically mentioned.

As to the mode of statement of the results of water analyses, there is no doubt that, as Dr. Longstaff says, it is in a very unsatisfactory condition. Something ought to be done, and I hope will soon be done in the matter. I am convinced that the mode I adopt is the best, because I have seldom yet met with a man of ordinary intelligence—a man, in fact, who would be in a position to comprehend the really complicated results of water analysis—who had not a good notion of how much a gallon of water was, and of the actual weight called a grain; while outside the world of scientists I have not yet had the fortune to meet with any Englishman to whom a milligramme or a litre conveyed any definite idea. Therefore I think it is far better to express the results in weights and measures which are, so to speak, to a certain extent tangible to the mass of the intelligent public, rather than in terms which are unknown outside the walls of a laboratory.

79, Gt. Tower Street, London, G. W. WIGNER.
December 24, 1877.

ROGERS FIELD'S PATENT FLUSH TANK.

(*To the Editor of the* SANITARY RECORD.)

CAN any of the numerous readers of the SANITARY RECORD inform me through this medium of whom this article can be obtained, especially the smaller and less expensive kind made in earthenware? I learn from Messrs. Bailey and Co., Fulham Pottery, that they no longer manufacture them. JOHN S. HODGSON.

Sanitary Invention.

DODD'S PATENT VENTILATED WATER-CLOSET.

THE researches of the late Dr. Parkes, Dr. Angus Smith, Dr. Miller, Dr. Marston, Dr. Herbert Barker, Dr. Richardson, Dr. George Wilson, Dr. Letheby, Dr. Odlins, Dr. Guy, Dr. Murchison, and of many other eminent authorities upon sanitary matters, have conclusively proved the origin of enteric fever, and a host of other diseases, to be traceable to the entrance of sewer gas into dwelling houses. The most common causes of this mischief are to be found in badly constructed water-closets, untrapped drains, and unventilated soil-pipes. Admitting, in the face of incontrovertible facts, the necessity of using every precaution to repel the invasion of so insidious a foe to health, the adoption of an apparatus combining the several advantages of perfect flushing, simplicity of construction, ventilation of soil-pipe, and efficient trapping, must recommend itself to the notice of all who desire to obtain a maximum of good result at a minimum of outlay. While admitting the value of disinfectants, we cannot refrain from giving preference to an arrangement which seldom or never gives occasion for their use, owing to the trapping immediately under the receptacle for excreta, and ventilation of soil-pipe directly under this.

The flushing-water instead of acting upon a small portion of the pan, flows over every part of it, finally passing out through an outlet almost concealed from view in consequence of its position in the front part of the receptacle. This consists of a twofold arrangement, first a basin, some three or four inches deep and ten in diameter. Between this basin and the front of the pan is a space some five inches wide and about ten deep—a second basin, in fact. The front of the upper basin is prolonged downwards, terminating at a space three or four inches below the water level of the lower basin, and dividing it into two portions. This lower pan may be compared to an ordinary basin, with its front side carried upward to the seat of the closet, and the hinder portion standing on a level with the top of the soil-pipe; the front portion of the upper basin, as mentioned, passing down and dividing the lower into two equal portions, and by the interposition of the division effectually preventing the entrance of sewer gas by the large quantity of water it retains.

An obvious advantage possessed by the peculiar shape of the pan is that the lead apron so frequently used in old-fashioned pans may be dispensed with. These precautions are supplemented by a ventilating pipe of large capacity—half the diameter of the soil-pipe and on a level with the water in the back portion of the lower basin. It will thus be perceived that no pressure of gas can ever be exerted on the water standing in the basin. Should the soil-pipe become stopped by any accident the ventilating tube may be unscrewed and the obstruction removed.

The whole contrivance is in one piece of the best

hard glazed white earthenware. No metal is used in any part of it. There are no valves to get out of order. It affords so large a passage for the escape of excreta that the stoppage of the pan becomes almost impossible. Owing to its simplicity of construction, the apparatus will remain in efficient use for years without attention.

The absence of mechanical contrivances renders it practically indestructible. By the ingenious arrangement of the lower pan, so long as this is filled with water, even should the ordinary supply fail, the closet never becomes untrapped for an instant. Valve closets are dangerous, because in them while the valve is open direct communication is made with the soil-pipe each time the handle is pulled, a source of danger frequently alluded to in reports on the sanitary condition of houses by medical officers of health.

In conclusion, we have to remark that this apparatus appears to meet nearly every difficulty in the disposal of excreta. It is as inoffensive to the eye as such a contrivance can be, and gives no trouble.

A Certificate of Merit was awarded at the Manchester and Salford exhibition of sanitary appliances to Mr. Dodd, the patentee and manufacturer, 6, Thomas Street, Liverpool.

Notice of Meeting.

THE INSTITUTE OF CIVIL ENGINEERS.

THE following gentlemen have been duly elected to fill the several offices in the Council for the ensuing year:—Mr. John Frederic Bateman, F.R.S., President; Mr. J. Abernethy, Sir W. G. Armstrong, C.B., F.R.S., Mr. W. H. Barlow, F.R.S., and Mr. J. Brunlees, Vice-Presidents; Mr. W. Baker, Sir J. W. Bazalgette, C.B., Mr. F. J. Bramwell, F.R.S., Mr. G. B. Bruce, Sir John Coode, Mr. W. Froude, M.A., F.R.S., Mr. G. F. Lyster, Mr. W. Pole, F.R.S., Mr. C. W. Siemens, F. R. S., Mr. D. Stevenson, F.R.S.E., Sir Jos. Whitworth, Bart. F.R.S., and Mr. E. Woods, Members; and Col. H. Hyde, R.E., Mr. J. P. Knight, and M.-General Scott, C.B., R.E., F.R.S., Associates.

The next meeting will take place on Tuesday, Jan. 15, 1878, at 8 P.M. Business: Address of Mr. Bateman, President, and Monthly Ballot for Members.

APPOINTMENTS OF HEALTH OFFICERS, INSPECTORS OF NUISANCES, ETC.

CLEXTON, Mr. John, has been reappointed Inspector of Nuisances for the Belper Rural Sanitary District at 200*l.* per ann. for five years.

CLARKE, Mr. Arthur Lennox, has been reappointed Inspector of Nuisances for the Bedford Urban Sanitary District.

JEAFFRESON, George Edwards, M.R.C.S. Eng., L.S.A. Lond., has been appointed Certifying Factory Surgeon for the Framlingham District.

LONGCROFT, Mr. E. R., has been appointed Clerk to the Catherington Guardians and Rural Sanitary Authority, vice Mr. C. J. Longcroft, deceased.

LONGDIN, Mr. Thomas, has been appointed Surveyor and Engineer to the Corporation and Urban Sanitary Authority of Warrington, vice Vawser, resigned, at 250*l.* per ann.

PLOWRIGHT, Charles Bagge, L.R.C.P. Edin., M.R.C.S. Eng., has been appointed Medical Officer of Health for the Freebridge-Lynn Rural Sanitary District, vice the District Medical Officers whose appointments are about expiring, at 80*l.* per ann. from January 1, 1878, to June 24, 1879.

ROBINSON, William F., Esq., has been appointed Treasurer to the Lichfield Guardians and Rural Sanitary Authority, vice Perks, resigned.

WILSON, Robert Archibald, M.D. Univ. Glasgow, has been reappointed Medical Officer of Health for the Lunesdale Rural Sanitary District, Lancashire, at 25*l.* per ann.

SANITARY PATENTS.

3956. Improvements in hydrants. John Henry Johnson, Lincoln Inn Fields, London. A communication from Frederic Reese, Dortmund, Germany.

3992. Improvements in apparatus for and in the treatment of ammoniacal liquids. Frank Wirth, Frankfort-on-the-Maine, Germany. A communication from Julius Vorster and Hermann Gruneberg, Kalk, near Cologne, Germany.

4083. Improvements in ventilating and keeping pure the air within and around dwellings and other buildings. Edward Gregson Banner, Billiter Square, London.

4106. Improvements in smoke extractors and ventilators. Richard Searle, Cheltenham, Gloucestershire.

4115. An improved pan or vessel for water or other closets, also suitable for other useful purposes. William Martin, Oldham Road, Manchester.

4198. Improvements in the covers of sanitary and other pans or vessels, and in fastenings for the said covers. James Morris and Edward Morris, Birmingham.

4323. Improvements in the apparatus for the purification of coal gas. Carl Pieper, Dresden, Saxony. A communication from August Kloenne, Dortmund.

4333. Improvements in ventilation. Charles Stephen Robinson and George George Goldsmith, Leicester.

4150. Improvements in ventilators. Robert Boyle, Glasgow, Lanarkshire, N.B.

ABSTRACTS OF SPECIFICATIONS.

824. Collecting and purifying sewage. R. Turnbull.

This consists in use of a rectangular tank with (say) three transverse divisions successively lower: the second last compartment is a filter of coarse sandstone, with grating at bottom above an opening in the higher of its sides; and the last is a filter with layers of freestone, gravel, sand, and charcoal, an inclined tray at top, and a bottom grating through which the sewage water passes to a testing tank. The sewage passes from the first tank to the second through a grating at the top of the former, extending from its lower vertical side to a downward projecting tongue. In the test tank two tongues form a trap for gas, and a pipe leads from the space between them to a small test pump.

860. Treating sewage, etc. J. Hanson.

The sewage is treated with waste hematite, sulphurous gas, and a mixture of alum, soda, and black ash refuse. Purified waters are softened with carbonate of potash, or nitre cake.

933. Ventilating buildings, carriages, etc. J. E. Ellison.

The aperture used is made larger on the inside than the outside. Intermediate chambers are inserted, having sides of wire gauze or the like material, and containing charcoal or any porous non-conducting material.

1137. Traps for noxious gases from drains, etc. G. Schofield.

This consists in the formation of one main gulley, with one or more smaller internal gulleys; to each of them is fixed, so as to allow the flow of water and sediment therefrom, a small valve or trap, with facings, hinged so that the volume of water passing from the smaller into the larger, or from the larger to the smaller drain, will open the respective valves, and when not so operated upon the valves will remain closed

1198. Regulating ventilators. N. Hunt and W. N. Cox.

This consists in utilising the expansion of air (by rise of temperture) in one vessel to force liquid out of this vessel through a thin tube into another, causing increase of weight in the latter, which increase may be made to affect a ventilator in one direction by levers, etc. (the opposite occurs in the case of contraction through cold). The first vessel may contain air alone, and may act through pneumatic bellows, and a valve which governs the motion of hydrostatic bellows connected with the ventilators.

1296. Cowls. W. R. Manders and R. B. Cave.

The cowl is made with, say, four sides, each of which has an opening with a covering flap swung by a hinge. In normal condition the flaps hang partly open to let the smoke escape. Each flap is connected to the opposite one by a rod, so that when the wind blows the flap to windward is entirely closed, and the opposite one doubly opened.

1354. Stench traps. W. R. Lake.

This consists of a syphon trap with an air chamber above, communicating with the arch of the syphon to prevent filling of the discharge branch of the syphon with water, and syphoning out of the trap; there is also an air chamber connected with the discharge branch, to allow bubbles of air or gas to burst and escape from the overflowing water. The two air chambers communicate with each other. The syphon tube is automatically opened and closed by a cord rigidly suspended from a buoy. A disinfecting chamber is connected with the buoy chamber, and when the buoy floats the water enters this chamber through perforations, dissolving some of the disinfectant.

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